Efficacy Study of LightSail in Three Public School Districts

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Contents

EXECUTIVE SUMMARY: LightSail Evaluation in Three Public School Districts

The present evaluation study sought to determine how LightSail is implemented within schools in three public school districts, Evergreen Public Schools (EPS), Denver Public Schools (DPS), and Oakland Unified School District (OUSD). Case studies conducted in a subsample of schools within the three districts included classroom observations, interviews, and focus groups. In addition, a survey was administered to teachers and students in two of the districts and usage data were collected from all three districts. In the sections below, we will synthesize and interpret results relative to the major evaluation questions that guided the study.

Implementation Practices

Results indicate that teachers in all three districts are attempting to use LightSail for its intended purpose of providing an individualized, independent, and self-selected reading experience for all students. Teachers' reported use of LightSail for reading time ranged from 20 to 30 minutes twice a week to daily with only a few exceptions. These exceptions included teachers who started out using LightSail more frequently, but because of issues with devices decided to use LightSail only occasionally, and a few teachers who use LightSail time for other subjects, such as a teacher who wanted to add more math practice time for her students. Usage data provided by LightSail, however, indicated that time spent by students on reading text were significantly less, approximately six to seven minutes. Across all three districts, teachers reported during interviews that students spent more time on progress monitoring, choosing texts, and responding to technical glitches than they did reading.

Most teachers used LightSail's most basic functions such as setting students up in the system, determining a starting Lexile level, and teaching them how to choose a book to read, and follow the assessment and progress monitoring procedures, without much outside support and with few implementation problems. At this level of use, most students and teachers were able to reap benefits such as vocabulary development from wide reading, practice with selecting multiple strategies for comprehension, and increased reading fluency unless technical glitches took away the available time for a positive experience with the program. Teachers and students who moved on from the initial mechanics of the program were by far the minority, but those who did perceived the advanced program features such as ThinkFeed as valuable to increasing students' reading skills and motivation to read. A potential explanation for the very limited use of the more advanced features of LightSail may relate to participants' perceptions that professional development was insufficient. Teachers may need to receive an initial overview of the program prior to the school year, then more one-on-one coaching or modeling of the more advanced features of LightSail within their classrooms once they have mastered the basics. Further, the technical glitches and inability for teachers to

access LightSail on a desktop or web-based version may have precluded their ability to fully leverage features of the program.

Participant Reactions

Teachers, principals, and coaches agreed that the LightSail schema for determining reading levels and assigning texts combined with embedded on-going assessments and communication among users works well with students who are performing at grade or close to grade level. Students who are performing significantly below grade level, ELLs, and especially students who do not assess beyond a beginning reader, are not able to easily access all the benefits of the program. In some instances, the lowest scoring students had the entire library opened to them when their score did not fit within the parameters of the program, and thus they needed more guidance from their teacher when choosing texts. Further, students expressed frustration that when they reached a high Lexile level, there were fewer reading options.

Despite technical issues experienced in all three districts, many principals, teachers, coaches, and students expressed positive perceptions of the program. Students reported widely that having many choices for their independent reading was important to them and that they enjoyed having time to read without other assignments attached. Teachers were also positive towards LightSail in terms of promoting personalized learning and agreed that monitoring student progress on a dashboard is useful. Principals liked the accountability that LightSail can provide, and the practice with trouble-shooting everyday problems on a device since state accountability systems are becoming increasingly dependent on technology.

Concluding Perspectives

LightSail implementation was below expectations in all three districts and contributing factors appeared to involve technical issues and lack of teacher knowledge. Staging PD to begin with assistance before implementation with trouble shooting and preventing technical issues, choosing the appropriate texts in the correct quantities based on students' past performance and curricular plans, and then following-up with instruction for more refined use of program features may spur teacher interest and increase minutes for reading text. Follow-up at the conclusion of the school year to include support in purchasing more texts to respond to students' reading growth as well as incoming students, how to interpret LightSail data, and how to incorporate more advanced use of LightSail would facilitate more robust use of the program. Such support could be supplied through a mixture of online communications, both live and prepared videos for commonly requested topics, and on-site meetings.

Teachers, principals, coaches, and students found great value in the LightSail experience. Students responded enthusiastically to the opportunity to express themselves through self-selection of texts and the option to read without interruption

for a period of time. To see the growth in reading performance that one would expect to follow such high student interest in reading, LightSail representatives and teachers will need to continue to work together to find the time to communicate and remove interruptions to the learning process, and to enhance the teachers' facility with the program. With these supports in place, the program shows definite promise to provide students with an essential component in learning to read and reading to learn.

Efficacy Study of LightSail in Three Districts

LightSail's literacy application embeds instructional tools and a variety of assessment types into the texts, delivering instant, actionable data and accelerating student growth. Within the LightSail program, students access a library of digital texts on their individual devices. While reading, students respond to embedded reading comprehension assessments (multiple-choice, short-response, and cloze). Students and their teachers are able to view student progress data, including the number of books read, performance on embedded assessment items, student Lexile measures, and real-time data on reading behaviors (e.g., what book a student is reading, a student's current reading speed). One key assessment type, the cloze, utilizes The Lexile® Framework for Reading, developed by MetaMetrics, which is a measure of an individual student's reading ability, as well as a measure of text complexity. As the student's Lexile measure changes, the digital library for that student automatically updates to showcase "just right" texts, meaning any texts within +/-100 Lexile measures of the student's demonstrated reading ability.

Schools within a total of three districts adopted the digital libraries and rolled out LightSail at various points in the 2015-2016 or 2016-17 school year (i.e., they were new users). The present report focuses on preliminary findings within the three districts to explore implementation progress. The following research questions were examined:

1. How is LightSail being employed by teachers and students within each district with regard to program-specific activities and technology usage?

2. What are the strengths and weaknesses of the program implementation and recommendations for improvement?

Method

Design

The design of the present study included two parts. The first is an efficacy study with a replicated longitudinal quasi-experimental design in which schools implementing LightSail in grade 4 in the 2015-16 school year (Evergreen Public Schools) or 2016-17 school year (Denver Public Schools and Oakland Unified School District) are compared to schools not using LightSail ("control" schools) over a two-year period. Evergreen Public Schools (EPS) completed year one in 2015-16 and completed year two in 2016-17. Denver Public Schools (DPS) and Oakland Unified School District (OUSD) completed year one in 2016-17. The study design used mixed methods including quantitative and qualitative data as described below to address the research questions.

The second part of the study included case studies to supplement the efficacy study. Site visits to the three school districts were made to examine a subset of schools in each as brief "cases." The resulting case studies place focus on characterizing the processes and outputs associated with program implementation and outcomes during the year. The district-level case study methodology described below addressed the evaluation questions via observations and interviews.

Participants

Participants in this study included schools within three districts: EPS in Evergreen, WA, DPS in Denver, CO, and OUSD in Oakland, CA.

EPS. Evergreen Public Schools is the fifth largest school district in the state of Washington with approximately 27,000 students across 21 elementary schools, 6 middle schools, and 5 high schools. As of the 2014-15 school year, the dominant race/ethnicity was White (63.20%), followed by Hispanic (17.20%), then Asian/Pacific Islander (8.40%). The mid-size city district has a relatively low (11.42%) proportion of students enrolled in English Language Learners (ELL) classes, 13.1% of students have Individual Education Plans (IEPs) and just under half (48.47%) of students are eligible for free or reduced-price meals (FARMS). The Evergreen Public Schools district (EPS) has also embarked on several initiatives while also using LightSail, including Project Based Learning (PBL) and a Science, Technology, Engineering, and Mathematics (STEAM) focus.

The district selected 10 schools to implement LightSail beginning in the 2015-16 school year and then identified 11 schools to serve as control schools. As illustrated in Table 1, there were statistically significant differences in regard to the proportion of special education students. Treatment schools had a lower proportion of special education students as compared with control schools. Control schools were more consistent with the proportion of special education students in the district overall.

Table 1
EPS student demographic characteristics for 2016-17

	District %	**Treatment %**	**Control %**
Female	48.3	48.8	48.3
Asian	6.6	5.3	5.2
Black	3.0	2.1	2.2
Latino	18.5	21.6	23.1
Mixed Race	7.6	9.3	9.6
White	62.0	59.6	57.3
Other Race/Ethnicity	2.3	2.1	2.5
Special Education	13.0	10.7*	13.6
FARMS	55.7	52.5	56.1
ELL	11.4	22.0	20.3

*$p < .05$

DPS. DPS is a large city district within Denver, CO serving approximately 92,000 students in 199 schools including 93 elementary schools[1]. The predominant ethnicity in DPS as of the 2016-17 school year was 55.5% Hispanic, followed by White (23.2%), then Black (13.4%) students. The district has one-third (36.8%) of students classified as English language learners and 37% of the student population are Spanish speaking students. The district estimates that 67.3% of students are eligible for free/reduced price lunch. The district selected 11 schools to implement LightSail beginning in the 2016-17 school year and 11 control schools were then selected. As displayed in Table 2, treatment and control schools were comparable on demographic variables and differences were not statistically significant.

Table 2
DPS student demographic characteristics for 2016-17

	District %	**Treatment %**	**Control %**
Female	49.1%	47.7%	48.8%
Asian	3.3%	2.3%	3.6%
Black	13.8%	9.0%	10.0%
Latino	56.8%	50.1%	51.5%
Mixed Race	3.2%	4.4%	4.7%
White	22.1%	33.2%	29.4%
Other Race/Ethnicity	0.9%	1.0%	0.7%
Special Education	11.0%	11.9%	9.4%
FARMS	62.6%	59.2%	62.8%
ELL	27.7%	27.9%	28.6%

OUSD. The Oakland Unified School District is the 12th largest school district in the state of California with approximately 49,600 students across 48 elementary schools, 6 grade K-8 schools, 13 middle schools, 3 grade 6-12 schools, 7 high schools, and 37 district authorized charter schools. As of the 2016-17 school year, the dominant race/ethnicity was Hispanic/Latino (41.3%), followed by African-American (25.2%), and to lesser extents, Asian (13.6%), and White (11.1%). The district has nearly one third (30.8%) of students enrolled in English Language Learners (ELL) classes and just under three quarters (72.5%) of students are eligible for free or reduced price meals[2]. Oakland has the most diverse population in the state of California and over 50% of students in district schools speak a non-English language at home. The district also serves 2,200 newcomer students and over 1,000 refugee, asylee, and unaccompanied minor students, and 14 schools have official Newcomer Programs. Students speak 53 different languages, with 33.7% Spanish, 4.6% Cantonese, 2.5% Arabic, 2.4% Vietnamese, and almost 1% Mam speakers.

[1] https://www.dpsk12.org/about-dps/facts-figures/#1473890264817-1aa2ce27-4615
[2] Oakland Unified School District. (2017). *Fast fact 2016-2017.* *https://drive.google.com/file/d/0B6QEqRqzjxxzLXpvbFJFWFMwV28/view*

The district selected 10 schools to implement LightSail in the 2016-17 school year and then 10 schools were identified to serve as control schools. As displayed in Table 3, treatment and control schools were comparable in terms of demographic variables (no significant differences).

Table 3
OUSD student demographic characteristics for 2016-17

	District %	Treatment %	Control %
Female	48.4%	48.3%	45.4%
Asian	13.9%	12.9%	8.6%
Black	26.7%	20.2%	24.9%
Latino	43.8%	53.7%	53.0%
Mixed Race	4.5%	2.5%	2.2%
White	9.8%	7.7%	8.0%
Other Race/Ethnicity	1.3%	1.9%	1.5%
Special Education	11.0%	8.8%	11.9%
FARMS	86.7%	85.4%	82.9%
ELL	32.3%	46.9%	44.9%

Measures

Both quantitative and qualitative measures were employed in order to address the research questions. Data sources for the case studies included interviews, focus groups, and classroom observations. Data sources for the efficacy study included surveys, usage data, and achievement data. A team of two experienced evaluators visited three to four schools in each district for one day to collect data and acquire firsthand impressions of the school environments.

Interviews. During case study site visits, interviews were conducted with principals and lead teachers/instructional coaches at each school. The interview protocol (see Appendix A) solicited participants' perceptions regarding implementation, usability, perceived benefits of LightSail for students and teachers, strengths, weaknesses, and recommendations for future use.

Teacher focus groups. Also during site visits, the researchers conducted focus groups with classroom teachers implementing LightSail. Similar to the principal and lead teacher/instructional coach protocol, the interview questions (see Appendix B) solicited participants' perceptions regarding implementation, usability, and perceptions of the program.

Classroom observations. Classroom observations were conducted during ELA instruction time at each school. The observation protocol (Appendix C) documented levels of student engagement with the program, learning structures (e.g., individual, dyads, collaborative), and teacher instructional and management activities.

Teacher survey. An end-of-year online teacher survey included closed-ended (ratings) and open-ended items for teachers implementing LightSail. The survey was administered to teachers in DPS and EPS only given that OUSD implementation was delayed. Questions (see Appendix D) addressed such topics as (a) degree of knowledge of the program, (b) professional development and training experiences, (c) activities, and (e) perceptions of program benefits for students and teachers, strengths, weaknesses, and recommendations for future use. A total of 32 DPS teachers and 42 EPS teachers responded to the survey. Descriptive statistics and response frequencies are presented in Appendix E.

Student survey. A brief (10-min.) end-of-year student survey was administered to DPS and EPS students. Closed-ended and open-ended questions (see Appendix F) addressed such topics as (a) activities in using the program, (b) likes and dislikes, and (c) benefits for improving reading skills and developing interest in reading. Descriptive statistics and response frequencies are presented in Appendix G. The survey was completed by a total of 368 DPS students and 601 EPS students.

Usage data. The program collected data related to DPS, EPS, and OUSD student activities within LightSail (e.g., number of books read, number of minutes spent reading, number of short response assessment items answered and graded). In addition, the LightSail platform assessed students' Lexile growth, a measure of an individual student's reading ability, throughout the program. District-level and school-level usage data are presented in Appendix H.

Results

The following sections present results of data collected according to the evaluation questions. First, case studies from each of the three districts are presented. These case studies are followed by an examination of LightSail usage in the three districts, then perceptions of the program.

Case Study: Evergreen Public Schools

EPS began LightSail use during the 2015-16 school year in fourth grade, then fifth grade during the second year (2016-17). Four schools were visited in the spring of the second year of LightSail implementation. Within these schools, the proportion of free/reduced price meal (FARMS) eligible students ranged from 26.1% to 75.0%, and three of the schools are designated as schoolwide Title I. Title I funds allow for 1:1 distribution of devices in three of the schools, while the school with a lower FARMS rate had fewer devices. One school provides 1:1 iPads for students with the devices stored on a cart in each room. This school is preparing to add Chromebooks in a similar 1:1 fashion. Another school provides all iPads 1:1 to students for independent reading. The third school shares a mix of iPads and Chromebooks among classes on mobile carts to

reach a 1:1 level, and the fourth school also uses a mix of these two devices, shared on mobile carts, but does not have enough for a 1:1 distribution.

Data collection during site visits consisted of interviews, focus groups, and classroom observations. Interviews were conducted with principals and instructional coaches at each school. In addition, teacher focus groups were also conducted at each school, with a range of two to six fourth- and fifth- grade teachers participating. A total of 19 fourth- (n = 7) and fifth- (n = 12) grade classrooms were observed. Each observation lasted approximately 20 to 30 minutes during time assigned to independent reading. Classes had a mean average of 21 students per classroom and ranged from 16 to 26 students per class. Three of the 19 classes observed were Excel classes, the district's designation for programming for gifted students, and seven of the total are Studio classes, meaning that the teacher is participating in a technology rich approach to instruction. These classes were more likely to have one device per student available at all times, the teacher has had additional professional development (PD) and support, and higher expectations have been set by the principal regarding the integration of technology in learning.

During interviews and focus groups, participants indicated that LightSail is used as a supplement for core instruction. Other programs, such as Lexia and ReadingPlus, which are used in the district, are programs used for schools' intervention block. ReadingPlus focuses on reading comprehension and fluency, and Lexia focuses on phonics. In some schools, these programs are only used for students that need extra support; in others, these programs are available as an option to all students during independent reading time.

In terms of the difference with print books, participants stated that the LightSail platform is more than an e-reader: the books have embedded assessments and provide students with rewards for different reading activities such as reading books of different genres or for answering a number of cloze items correctly in a row. LightSail offers a level of accountability for students, monitoring whether they are flipping through pages too quickly or restricting access to some books because the student needs to read a Power Text.

Preparation to implement. Participants described the training received from LightSail. As described by coaches, the general approach for preparing teachers to implement the program was for LightSail to train the school-based instructional coaches and others that may assist with implementation (e.g., principals, librarians) at the start of the school year and then these coaches would return to the school to train and support classroom teachers. A LightSail coach also visited two EPS elementary schools for a half day in February, modeling the use of LightSail in classrooms and sharing practices with teachers.

Principals, coaches, and teachers were asked during interviews and focus groups whether or not they felt adequately prepared to implement LightSail. All participants conveyed that teachers were prepared in terms of the initial set up of LightSail – getting students logged on, completing the Power Challenge, and having students access texts. For example, one teacher stated, "Yes, we watched videos. We went through the process with kids – taking the Power Challenge, how to check out books" and another observed that "getting up and going was relatively easy and straightforward."

In terms of how to actually integrate LightSail within the classroom, nearly all described that teachers were not prepared. As one coach commented:

> *No, we were not prepared. LightSail was great in that they have a 'getting ready and launching' package so you as a teacher could pull up a PowerPoint that they provide for kids. Kids are so tech savvy it was an easy thing to log into. We were prepared in terms of we were given tools, but after that we weren't prepared in regard to the information it [LightSail] was collecting and how to use it. They have a pretty good website with videos of teachers using it but it's hard to remember that's there to go to and taking time to know what you want to look for.*

Another coach agreed and described her school's preparation to implement:

> *As coaches, we had an hour session with Lauren, a LightSail coach, at least a couple of times last year. Our media specialist got some LightSail training, too. Yes, initially in just getting kids on we had enough training. The next step of how to use for instruction we haven't gotten yet.*

Similarly, a principal stated, "We didn't really receive any of the deep training. We were trained to get kids on, but not trained on how to use it to its maximum capacity."

Teachers at another school described needing to spend time exploring the program on their own as they were given "a brief short training or overview on using it but there are things we had to figure out." A teacher at another school commented, "the initial PD was about getting up and running. I would have liked to have more about looking at data and how to use for classroom planning. We went over that but it was really brief and didn't stick."

School implementation. In terms of the involvement of administrators with LightSail implementation, most principals indicated very little involvement on their part, other than delegating responsibility for pedagogical and technical support. The instructional coaches appeared to be most involved in supporting teachers with the launch and use of LightSail. Most coaches described their role in launching the program at the school including setting up student accounts and managing the Power Challenge process, as well as assisting with technology questions that arose during the school

year. Coaches were the main point of contact for communications with LightSail except for one school in which the librarian took on the role. Rarely, if at all, were coaches viewed by teachers or themselves as supporting teachers with how to fully implement the program. Coaches explained that they did not have much more training than the teachers, and that training centered on how to get the program up and running. They reported that existing initiatives and goals set by the school administrators with their staff took precedence over learning more about LightSail, even though they almost unanimously agreed that LightSail has the potential to help them reach their goals. Time to meet with teachers to explore the advanced features such as annotating text, using ThinkFeed, guiding or assigning students' reading choices, and using the data generated by LightSail to inform instruction was not allotted and therefore these refinements are only being used by teachers who teach themselves.

During interviews and focus groups, implementation was described as either for independent free reading time or as part of a workshop model. First, most teachers indicated that LightSail was used between two and four days a week and students averaged 20-30 minutes per session. During this time, LightSail was used either for independent free reading time or as part of the teachers' instruction. A fourth-grade teacher stated "I use LightSail as a choice for them. I give them an option of a book cart of choices or they can use LightSail for reading time." A fifth-grade teacher commented that in her class, "they come in, get devices, and start reading. I try and conference with them. Most of the time LightSail is used independently with me walking around monitoring." Another teacher at the same school described conferencing with students as "I go around and confer with five to six kids a day. We look at their progress screen together and I listen to them read for a minute or two."

Few participants discussed the use of LightSail within a "workshop model," part of the teachers' instruction. A principal described this approach as during literacy instruction, there are mini lessons with shared experiences between students and the teacher. The mini lessons are followed by independent work time or partner work and the teacher meets with students individually. Afterwards, they come together to debrief and see what they have learned and if they have met the learning target.

Some teachers elaborated on how they have incorporated LightSail into their instruction beyond independent reading time, such as using LightSail for a specific reading task. For example, a fourth-grade teacher described the task she gave to her class of locating evidence to support a short-response question in LightSail. She commented,

> *If I don't see evidence there [in their response], I want them to go back and locate evidence, then add to their explanation. We just learned about metaphors and similes and I asked them to find that information in their LightSail books.*

A fifth-grade teacher described a similar use of LightSail:

> *I try to match it [LightSail] to what we normally do in reading. It's become where I've focused on any mini lessons I can pull out. I use it by using LightSail's rubric on the side of their short-response answers… Kids want to cut and paste their evidence into their answers and you can't do that on LightSail. It's a huge teaching point on how do you write evidence in your own words. We're doing reading responses by ThinkFeed.*

How LightSail was implemented appeared to relate to the PD received. As one principal commented,

> *…at this point, where we were given the devices without a lot of direction or PD and the direction was just 'let them [teachers] go out and experiment.' We really haven't received the training part. A couple of teachers have played around and figured out how to use the program as a conferring tool in our workshop model; others are just getting kids on and getting their reading minutes in. Some [teachers] have turned off the short-response and ThinkFeed option and are just having students reading because they're not sure how to manage it.*

EPS may have intended for instructional coaches to serve as the schools' expert on LightSail implementation. However, in none of the schools visited did coaches view themselves as experts, nor were they described as being a resource for implementation. For the most part, coaches led the initial set up process in schools at the start of the school year and were a primary point of contact for technical questions. Even then, coaches commented that they often did not know the answers to teacher questions but would work with teachers to find the answer.

Implementation of LightSail in the classroom. Distribution of devices as observed in about half of all visits was characterized by well-rehearsed routines and students moved through the process independently and without incident. In the other half, devices had already been distributed before the observation began. Logging on and opening the LightSail application (app) was easy and quick on iPads, but inefficient on Chromebooks. Some students and teachers reported slow downloads of the app or text on both devices some of the time, but students using Chromebooks were more likely to be plagued by slow downloads that used up to 10 minutes or more of a 20-30 minute reading period.

***Teacher activities*.** A variety of activities were observed related to independent reading. In three classes, only LightSail was observed in use, while in nine classes, two other reading programs, Lexia and Reading Plus were available to students. In the remaining classrooms, students also had the choice of reading paper books. Predominant teacher activities across all classrooms included:

- Monitoring for on-task behavior

- Facilitating students' use of the program
- Solving technical problems
- Conferencing with students using the program
- Conferencing with students related to the whole class reading book/differentiated reading group book while others worked with LightSail, Lexia, Reading Plus, or read a paper book.

At one school, for example, teacher activities were mostly management based. In two of the six classrooms, the teacher was actively monitoring student progress and in one fourth-grade class, the teacher moved from student to student, spending two to three minutes or less with some students asking questions about what they were reading and asking them to explain how they solved comprehension problems. In a fifth-grade class, the teacher moved around the room to watch students and to intervene as needed – redirecting, solving technical problems, and giving feedback regarding how the student was interacting with the text.

At another school, both teachers observed gave instructions, monitored start-up and progress, and conferenced with students. One teacher met with students individually, listening to them read aloud, asking comprehension questions, and inquiring about metacognitive strategy use. The teacher asked students text-based questions such as, "how do you know…," "can you find evidence in the text to support…," etc. She also moved to general facilitation as needed for the whole class or small groups of students in between the one-to-one meetings.

Another teacher started out with several minutes of direct instruction for the whole class on answering short response questions, and then tried to determine how many students were coming upon short response items in their LightSail texts by polling students once they started reading. None of the students were encountering any short response items, prompting the teacher to tell the observers, "the program has much more potential than what has been actualized in my classroom" and LightSail "needs some fixes to be useful and powerful."

Student activities. Almost all students were observed reading independently or attempting to find appropriate reading material. Student engagement was consistently high, but among those who were not, below-grade level readers were more frequently off-task than all others. On-grade level students progressed best, while some above-level and significantly below-grade level students struggled to use the program or experienced frustration finding texts that were both available (not presently being read by other users) and level appropriate. Approximately two to three students in most of the classes were observed attempting to resolve what they perceived as inconsistencies between their reading performance and the LightSail progress monitoring and rewards system.

Students most often:

- read LightSail texts,
- spent time choosing a text on LightSail,
- took the Power Challenge, checked progress and viewed badges on LightSail
- used other programs - Lexia, Reading Plus
- read paper books
- conferenced with the teacher
- Sent and received messages with the teacher; one student was observed receiving a message from a classmate.

At one school for example, student activities ranged from focused, on-task behavior, to off-task behaviors such as flipping through different pages of the LightSail text, scanning the trophy room, book choices, or Lexile page for longer than necessary. In general, most students in the fifth-grade classes and one fourth-grade class were actively engaged most of the time. In two fourth-grade classes, both with a large percentage of significantly below grade level readers, had at least half of the class disengaged for at least half of the time. In one fourth-grade class, almost half of the students were working on other programs such as Lexia, reading a print book, or were not attentive at all.

At another school, students on iPads or with hard copy books were engaged with their reading, followed directions, and were generally compliant. One child explained that he would rather pick up a book and just start reading rather than spending time getting started on a device. Other students noted that they did not need extrinsic motivation to read – they already like to read. Most students appeared to enjoy reading on their device if they were able to easily access a text, and many students expressed how much they liked having time for independent reading during the school day.

At the third school, students on iPads or with print books were engaged with their reading, while Chromebook users struggled or looked for something else outside of LightSail to read. Students who could get past the downloading problems and find an available book to read on LightSail were engaged and reported that they enjoyed reading. About half of all students had little time to read because of the downloading issue and/or the lack of available books once they were up and running. About a quarter of students could not find an "unlocked" (i.e., available) book to read.

At several schools, students were observed utilizing the "read aloud" feature of LightSail. Student would highlight a section of the text, then select an option for the program to read that passage aloud. In many instances, students would rely entirely on this feature and would not read any passages within the text. Their performance on embedded assessments, therefore, reflected listening comprehension rather than reading comprehension.

Challenges with implementation. A variety of implementation challenges were observed in classrooms, as well as conveyed during interviews and focus groups.

The implementation challenges appear to center on two areas: lack of teacher knowledge and technical issues.

Lack of teacher knowledge. As reflected in teachers' perceptions that they have not been fully prepared to implement LightSail, they described lack of knowledge of the program even now in their second year of use. For example, teachers described not understanding the meaning of badges and how they are earned, and some questioned how Power Texts work and how frequently students should be reading them. There was also a general lack of understanding of Lexile scores. Teachers commented that they did not know how students' Lexile scores were influenced. For example, one teacher asked, "When do they get Lexile scores? Some have scores that are updated, others do not." A teacher at another school asked, "what is the significance of Lexile growth?" In addition, one coach commented,

> *We haven't intentionally taught kids how to grow their Lexile, what that means and what you need to do as a reader. Does growing Lexile correlate with achievement and other measures? We don't know that.*

Lexile scores did appear to be a new concept for the district as they have been using Fountas and Pinnell levels and are struggling to translate these levels with Lexile levels. Beyond questioning components of LightSail, the majority of teachers were not aware of or did not discuss fully leveraging LightSail features. For example, teachers were not aware that they could assign a common text to students and that for some texts, the common text could be presented at different Lexile levels based on student needs. As one teacher commented, "I would like to assign books to kids, maybe one for the whole grade level, so I could see how each one answered a short answer for comparative analysis and as a teaching tool." This teacher expressed this desire without understanding whether or not LightSail included this feature. Another teacher questioned whether or not one was able to view the number of embedded assessment items across books. This teacher observed,

> *I have kids that read a lot of books and haven't run into a short answer [question] in their book while a Dorothy and the Wizard of Oz reader says he's getting them practically every chapter. I would really like to be able to expect that each book, each chapter, some consistency, has a short answer [question] because it is inarguably the most challenging work for kids and is a useful tool… It may be that I don't know how to use the software very well and am overlooking something.*

During observations, there appeared to be some glitches in the program that decreased the amount of time students spent reading. For example, at one school, both

teachers were trying to use LightSail at a more refined level but were having trouble using the assessment and communication features. It was not clear if there were glitches in the system or if the teachers need more time outside of class to explore how the system works. It seemed that there are features that the teacher can turn on and off and not understanding how to do this was causing an interruption in the flow of the sessions.

Technical issues*.* Observations, interviews, and focus groups revealed that classrooms within EPS experienced a variety of technical issues including device troubles, reporting issues, and issues that students experienced when engaging with the program.

- ***Devices*****.** During observations, the program appeared to consistently work more smoothly on iPads compared to the Chromebooks, which took too long to download text, especially for struggling readers and others who were easily distracted. The read aloud feature appeared not to work on Chromebooks, further frustrating struggling readers. Overall, for both teachers and students, technical issues led to irregular and infrequent use of LightSail.

  As one teacher commented, "sometimes it takes up to five minutes for the LightSail app to appear on the Chromebook so kids have to sit and wait. They definitely need to work out the bugs on Chromebook." The coach in that building also stated, "LightSail is not being used. I really don't think it is. It's just not working on the devices and teachers have found other things to do." A teacher in a different school expressed similar issues and explained that while they can download the LightSail Chromebook app and save it to the device, "some kids keep having to download it" as the app would not appear the next day.

- ***Reporting.*** An additional technical issue that was raised by both teachers and coaches was the reporting feature. First, when teachers accessed their teacher dashboard showing student status in the program on an iPad, they were able to view each student's Lexile score, what activity the student was doing (e.g., viewing books in the library, looking at their student dashboard, reading a book), and the Lexile level of the book they were currently reading. However, three additional columns of data were blank – minutes/page, thoughts created, and last login. As one teacher commented regarding the status page, "

  Students have read for several weeks and in most instances, as of March 1, there isn't any data on pages per minute, for example. It looks like they

haven't done anything which confuses me as to whether they're on task and productive, or off task and just looking at book titles.

Second, in some of these classrooms there were not enough devices available for teachers to access the dashboard while students used LightSail and they were unable to access LightSail on their teacher desktop computer. Relatedly, for schools that had devices shared by multiple classrooms, teachers were unable to access the teacher dashboard once the devices were needed elsewhere. Third, teachers were unable to view an aggregate report of all of their students within their class, only individual students. While coaches receive aggregate school and classroom reports each week, teachers do not receive these reports unless shared by coaches and teachers expressed a desire to have access to this information.

- ***Student technical issues.*** Besides Chromebook issues and reporting, participants also described that students experienced technical issues as well. A coach described that when a student reads an informational text, "they tend to not be reported as read because the program doesn't register that they completed the text because they haven't read the glossary." Further, the coach explained that the glossary was not accessible to students while reading these texts. Teachers also offered that occasionally, students do not receive credit for reading a text. For example, a student might receive the feedback on their dashboard that they read a book too fast, but some pages in the book were full-page images that could have affected the speed. In addition, as one teacher commented, "the data hasn't updated in 7 months and one student absolutely cannot get it to give her higher level books than about 710, even though she reads higher."

- ***Digital library.*** Teachers and coaches described issues with the books that are presented to students, particularly for those that are struggling readers or more advanced readers. One coach explained that students who score BR, or below reading level, have the entire library open to them and they can choose any book at any reading level, including those that might be too challenging. She also explained that "Students who score very high on the Lexile scale can choose from titles that may be developmentally inappropriate, such as a middle or high school text."

  Across all schools, some students wanted a wider variety of challenging and current texts to read. While informally engaging with students during classroom observations, students often commented that the books that

were available to them were uninteresting or unavailable because the school had not acquired enough copies for students. When faced with a lack of interesting books to read, students frequently opted for print books or were observed engaging in off-task behaviors.

Implementation successes. Across all four schools observed, students who were reading well enough to manage the program on their own quickly retrieved their devices and started reading right away, remaining engaged for the entire period. Teachers who were actively involved during independent reading time and LightSail use (e.g., logging LightSail data in a notebook, poster displayed with student progress, circulating the classroom while conferring with individual students) had the highest level of accountability and student engagement. Teachers who remained in one place for too long, or at their desks (even if meeting with students there) had more students engaged in off task behaviors.

Students that appeared engaged reported in conversations with observers that they liked the books they had read on LightSail, liked the freedom to choose a book, the opportunity for independent reading, and seeing their progress in a concrete format. Students who were doing well with the program seemed enthusiastic about choosing their texts, or continuing to read a book that they liked.

Other observed successes involved the teachers who demonstrated facility with LightSail features such as annotating texts and communicating with students as they were reading via devices. Teachers were able to direct students to non-fiction informational texts to work on main idea, fact vs. opinion, or new vocabulary in order to make meaningful connections with the reading of the class common book occurring during core instruction.

Overall, iPads loaded more quickly and were easier for students to use compared to Chromebooks. When students accessed LightSail, most students who spoke to observers reported that they love the opportunity to read a book independently. Students seemed to enjoy selecting books that they want to read, and having uninterrupted time to simply enjoy a book of their own choosing. However, some students experienced a greater degree of freedom to select a text than others due to availability at their reading level. The teachers who circulated to conference with students were able to guide students and prompt strategy use and reflection without interfering with students' self-selection and independence while reading.

Overall impressions. LightSail provides ample choice for students who can manage to read at a Kindergarten level or above, when the school has procured a digital library with enough copies of each title, and when teachers regularly encourage the return of texts as students finish them. Most texts were signed out for the entire 42

days possible. Students who score initially at BR need more resources and assistance navigating the program. Currently, these students have access to all texts regardless of reading level.

Most teachers were kept busy trying to troubleshoot technical problems and did not have adequate time to monitor student progress. Teachers had to use time to facilitate the logistics for a period (20 – 30 minutes), leaving little time to monitor and record progress, prompt and challenge students, suggest titles, or respond to annotations. Lower-level readers are left to struggle with an interface that requires them to read well and to follow directions, all to find that there are no books to read at their level. Rewards for reading are sometimes not reliable, reducing motivation they might have engendered.

Students enjoy selecting books that they want to read, and having uninterrupted time to simply enjoy a book of their own choosing. Teachers like the idea of collecting student data and monitoring students using LightSail. When glitches did not deter progress, teachers were able to guide students and prompt strategy use and reflection without taking away students' ability for self-selection and independence while reading.

Case Study: Denver Public Schools

DPS began LightSail use during the 2016-17 school year in fourth grade. Three schools were visited in the first year of LightSail implementation. One of the schools has 45% minority enrollment and a negligible ELL population[3]. Two of the three schools are Title I and serve populations that are approximately 90% minorities and 33% ELL. Within these schools, the proportion of FARMS students ranged from 15% to 93%. The school with the lowest proportion of FARMS-eligible students opened within the past three years with a technology and project-based learning focus. All three schools provided 1:1 devices, primarily Chromebooks, for the students in observed classes. Only one classroom exclusively used iPads for every student, while others provided a mix of devices.

Data collection during site visits consisted of interviews, focus groups, and classroom observations. The principal at each school was interviewed, as well as an instructional coach at one of the schools. Teacher focus groups with three classroom teachers were conducted at each school. In total, seven observations of fourth-grade classrooms were conducted within the three schools. All principals were relatively new to their positions at their schools, having been principals at their current schools for a period of one to three years. One teacher had more than 10 years of experience, while the majority of teachers had less than five years of experience.

[3] https://financialservices.dpsk12.org/student-submissions/

Compared to other ed-tech programs (such as Accelerated Reader, Raz-Kids, A to Z, and Scoot Pad), participants stated that LightSail quickly established student reading levels and provided within-text interaction with students. All of the participants noted the helpfulness of the tools available to teachers implementing LightSail, such as the ability to automatically track student progress and provide immediate feedback, features not available with print books. All teachers agreed that LightSail provides better checks for understanding, for instance when checking constructed responses. As one teacher noted, "If they're sitting and reading a book, they're just reading, but they're not checking for understanding. It [LightSail] is very interactive for them." All teachers agreed that students were more motivated to read and were reading more during independent reading time when using LightSail (tracked by the LightSail teacher tools), noting that LightSail offered more engagement and interactivity with texts than paper books or other reading programs. As one teacher stated, "LightSail holds them accountable for actually reading," and another: "[Students] are definitely more engaged when they get to choose what they want to read." One principal noted,

Reading online and then being assessed online puts kids at an advantage… There is no doubt that the kids are getting daily sustained personal reading; I think that makes a huge difference.

As compared to paper books, participants said that the LightSail library contains a broad range of texts at students' correct reading levels. As one principal stated prior to adopting LightSail, "Classroom libraries were thin, and the school library was underutilized, so there weren't many texts that ran the range that students need." Participants also said that LightSail was beneficial for struggling readers, providing a sort of anonymity, in that these students could select books at their own reading level without their peers being aware of the level of their texts.

Preparation to implement. Principals were the main agents in choosing to implement LightSail in their schools, and these principals stated several reasons for implementing LightSail. Two of the three principals sought to provide access to technological learning opportunities for their students. Two of three also liked the personalized learning and student-centered aspect of the program. Additional reasons for implementing LightSail included an aim to close gaps in college and career readiness, the ease of program implementation, and the digital literacy tools available to teachers.

During interviews, principals described the professional development they received in order to implement LightSail within their schools. Professional development for teachers was depicted as challenging, particularly during the first year of implementation. All teachers spoke of their lack of preparation. Specifically, many teachers had minimal understanding of how to use LightSail or what data points or functions they could access within the program. As one teacher stated, "I like it… but I don't really know what anything else means." This led them to feel unprepared when it

came to utilizing the features of the program, as one teacher proclaimed: "I think there's lots of strengths in the capabilities that we don't really use." Another teacher noted that the school had not prioritized enough time to properly implement LightSail, and that added to the feeling of being unprepared.

During interviews, two of three principals mentioned having limited access to the program due to their schools' technology limitations: lack of iPads or Chromebooks (enough for school-wide 1:1), or LightSail's general incompatibility with Chromebooks, as several participants noted more technical difficulties with LightSail on Chromebook than on iPad. One principal stated that their teachers did not understand the training they received from LightSail and had better success when trained by the school's own reading specialist. They also noted, "LightSail has always provided help, but it was tricky when it first started; a lot of glitches." Another principal commented that "[LightSail] gives a lot of materials, but it's a lot of material to get through." Similarly, several teachers noted that the materials provided by LightSail (including PowerPoint presentations and learning videos) did not go into enough detail about how to use all the features of LightSail. Nearly all teachers and principals expressed a need for more PD on features of LightSail and how to best utilize the program in their classrooms.

School implementation. All teachers using LightSail described implementing the program for 30 to 60 minutes of independent reading every day, with one teacher supplementing her Spanish lesson with additional ELL independent reading time. One principal stated that LightSail was also being used as part of reading stations and to assign homework. In two of the three schools, LightSail reading challenge posters were on the walls of the school, as well as in several classrooms. Several teachers noted that the students enjoyed challenging other classes and other schools during reading challenges that LightSail offers. These reading challenges involve selecting winning schools based on the time students spend reading.

During interviews, participants differed widely in their views regarding administrative involvement with implementing LightSail. One principal stated that they had taken the lead in implementation during the first year but that the implementer role was now held by the reading specialist, who more actively checks on how students are using LightSail. Another principal stated that the administration monitors the reading minutes of the school on average, orders books based on teachers' polls, and communicates with LightSail for reports on individual classrooms. One principal commented, "I'm the most involved, I think, but it's a pretty light load for me, so my involvement is pretty minimal." The principals went on to say that they look at weekly reports, have conversations with teachers about specific struggling students, promote the reading challenge (which provided engagement for students), and compile monthly data for LightSail. Though administrators stated their involvement, all teachers commented that there was a lack of direct involvement on the part of the administration. One school had created a reading specialist position, but LightSail was only a part of their responsibilities and adequate time wasn't assigned to developing

LightSail training, as the reading specialist stated: "It's up to the teachers to manage." Another school had assigned a teacher leader as the LightSail lead, but that individual did not feel prepared nor trained enough to successfully manage the responsibility.

Implementation of LightSail in the classroom. Of the seven DPS classrooms observed, the typical class consisted of 16 students and occasionally two teachers (one head teacher and one assistant or specialist). Nearly all classes observed consisted of fourth-grade students, with one class consisting of fourth- and fifth-grade students. Chromebooks were mainly used within schools, with only one class using iPads exclusively, though some classrooms contained both devices. Many classrooms, in addition to their tech reading devices, also had classroom libraries with paper books. Many teachers allowed their students, during reading time, to choose the method of reading: LightSail, paper book, or another reading program if available. In fact, many classrooms seemed to utilize LightSail as a component or option of an overall reading literacy strategy which incorporated other literacy programs such as Accelerated Reader or Raz-Kids. However, the predominant choice of reading method was LightSail.

Teacher activities. Teachers were usually engaged in one major activity during independent reading: leading small group work. Within all but one classroom, teachers incorporated small group work into independent reading time. These small groups consisted of three to six students who worked with the teacher on reading skills while other students in the class independently read. In a few classrooms, a supplementary reading teacher or instructional specialist would also work with a second group of students. When a second instructor was used, the two small groups were organized into sections of struggling readers and exceptional readers.

In all classrooms, students were allowed the choice between paper books or LightSail, though the predominant choice for students was LightSail. However, several students, when asked, said they preferred reading paper books rather than reading on a device. For example, one student commented that there are no glitches and no waiting with paper books, while another stated that there was more variety at their level with paper books. When working with a teacher in small groups, students usually used paper books. In two classrooms, the small groups who worked with the teacher changed with other students about every ten minutes. Of the seven observed classrooms, one teacher – instead of small groups – worked one-on-one with struggling readers. This teacher also walked around the classroom checking on students' progress and activities during independent reading time. However, all other teachers rarely to never walked around the classroom to check on students who were independently reading, though some teachers occasionally checked student activity on their own device.

Student activities. As noted, students usually used paper books when working in small groups with a teacher. Slightly more than half of students observed were engaged in reading on LightSail, and these students overall were actively engaged with

the program, be it reading a text, answering questions, tracking their progress, or purposefully browsing. However, nearly half of students observed were, for the majority of the observation, engaged in off-task activities such as extended time browsing titles, using the device for a purpose other than LightSail (e.g., chatting or surfing the Internet), talking to nearby students, or looking about and wandering around the room. The high FARMS school tended to have a greater number of students engaged in off-task behaviors but classrooms in all three schools had students fully engaged in reading with little off-task behavior. Nearly a quarter of students in all three schools experienced a technical difficulty of some kind, though this rarely deterred them from returning to their previous activity. Students that were actively reading seemed engaged with the text, taking time to look at pictures, answer questions, and occasionally ask a classmate a question about the text or vocabulary.

Challenges with implementation. LightSail was available in all classrooms during independent reading time. There were three main implementation challenges in the observed classrooms including (a) off-task behavior, (b) technical issues, and (c) lack of teacher knowledge about the program.

Off-task behavior. Students being on devices ostensibly to use LightSail did not always mean that they were reading. Students were frequently seen to be browsing the Internet or chatting online while on the devices. More so, though students would have LightSail open on their device, they would be talking to other classmates, looking around the room, or paying attention to something else. It was difficult for teachers to enforce reading engagement with LightSail, for even if a teacher came by to check whether students were reading, it was easy for students to switch between programs on the device and return to LightSail.

Technical issues. Students were also distracted from reading by an abundance of technical problems using LightSail. Frequently, students would be booted from the program and forced to restart, or the program would return them to the start of their book, or it would erroneously grade their work (forcing them to return to the beginning of the text). Teachers were often called upon to solve the technical issue, which disrupted the class and affected the teacher's, and the student's motivation. Students also complained that the books they wanted to read were not available due to the titles being checked out and there being a long wait time to access particular titles.

All teachers frequently mentioned the large number of technical problems they encountered on a daily basis, as one teacher noted: "I want more tech support due to the number of glitches." Two teachers commented that the value of LightSail was not worth the time spent constantly addressing technical issues.

Lack of teacher knowledge. Another frequently mentioned challenge was the lack of teacher control, particularly over things such as setting students' reading levels, changing the availability of Power Texts, and manipulating how data are presented. As

one teacher stated: "Teachers feel helpless when kids are asking for help because they [teachers] can't manipulate the program enough." One principal observed that the program held less appeal for struggling readers and that it needed more student-friendly options for younger children.

Implementation successes. In all classrooms, students demonstrated a routine for working with LightSail. Whether it was a teacher prompt ("It's LightSail time!") or independent guidance, students knew where to get devices, what program to log into, and how to navigate their texts. Several classrooms had LightSail reading minute progress posters on the wall, and students in class would occasionally discuss what texts to read and what texts they had been reading. Students frequently mentioned that their engagement with texts was due to being able to choose the texts they wanted to read. One teacher also utilized the ability of LightSail to distribute texts based on level (e.g., same article, different reading level), which allowed for whole-class reading work.

Many participants noted the association of LightSail with students being able to navigate careers and learning in the 21st century. As one principal stated, "LightSail has them [students] reading and exploring content in a format that is 21st century: it's online, digital, interactive, and adaptive." Several teachers and principals, in talking about their school and the focus on incorporating student-centered learning ideals, also highlighted LightSail as providing students opportunities to set their goals, choose their materials, and work independently. One teacher declared,

> *It's awesome having kids being able to monitor their own progress, and with all the tools and tabs, to see their progress and the number of minutes they're reading and seeing all the books they read and students are able to set their own goals. This goes hand in hand with voice and choice.*

Though all observed classrooms had in-class paper-book libraries, LightSail provided teachers and students more resources to access, with one teacher noting: "I have a classroom library, but the kids go through it in a month." Several teachers also highlighted their enjoyment of having questions, rubrics, and other materials already created which related specifically to each text, meaning that the teachers did not have to prepare individualized material for each and every book.

Overall impressions. LightSail provides a large breadth and variety of texts and genres for students to actively engage in reading. By providing interactive material to accompany reading, teachers note that students spend more time actively reading than with paper books, and their behaviors can be monitored by the LightSail program and thus by the teachers. For instance, a teacher can now be acutely aware if a student is actively reading, or if students are staying on one page, turning pages too quickly, or reading without comprehension as evidenced through embedded assessments.

However, many DPS students in all three schools were frequently seen engaging in off-task behavior when on devices, such as chatting, gaming, or Internet browsing instead of reading on LightSail. Students can and do set their own goals and can monitor their progress with badges and Power Texts. This student choice, however, is mitigated by the availability of particular texts within a school (i.e., popular texts are much less available). Further, the range and scope of texts becomes limited on both ends of the reading spectrum (i.e., limited for struggling readers and for gifted readers).

Technical issues were a large detractor for students and teachers alike. There was at least one technical concern in each observed class, with teachers acting as technical support for a product that they did not feel very well trained in using. Though students were often able to restart the program (or use a paper book), the continuity of their reading engagement was disrupted and this would occasionally lead to students becoming distracted and losing motivation. The implementation challenges in generally seem largely attributable to a lack of professional development and teacher training in utilizing and understanding the mechanisms of LightSail.

In sum, all schools and teachers enjoy the capabilities and potential of using LightSail to support student reading. However, the majority of participants also believe that they are not using LightSail to its full potential, which they think could greater impact the increase in independent reading that they have already seen. Though students were often off task during independent reading time, the majority of students appreciate being able to choose their own texts, as well as being able to monitor their reading progress, which encourages more active reading.

Case Study: Oakland Unified School District

Four OUSD schools were visited in the spring of the first year (2016-17) of LightSail implementation. All four schools are designated as school-wide Title I, with the percentage of free/reduced price meal eligible students ranging from 92.7% to 96.2%. Within these schools, a total of nine fourth-grade classrooms were visited with each observation lasting approximately 20 to 30 minutes during time assigned to independent or silent sustained reading. Classes had an average of 23 students per classroom and ranged from 17 to 28 students per class. Students used Chromebooks to work on LightSail and although most device carts were shared across classrooms, each student had an individual device during LightSail time. Principals were interviewed in three of the four schools, 10 teachers participated in four focus groups (one focus group per school), and the literacy coach was interviewed at each school.

Participants were asked to describe how LightSail compares with other ed-tech programs and reading from print books. Respondents listed Accelerated Reader (AR), Imagine Learning, Raz-Kids, and ST Math as comparable and use of these programs varied by school, grade, and students' needs. Two of the three principals interviewed noted that LightSail was better aligned with state tests and California and district

standards. One stated that LightSail was "more cutting edge" while a literacy coach agreed and added that LightSail was compatible with the Scholastic Reading Inventory, the assessment formally required by the district.

Teachers had the most to say about LightSail compared to other ed-tech programs and paper books. One teacher noted that when using AR, the student takes a vocabulary quiz and a basic fluency check. The program then allows students to read any selection they want regardless of reading level. Teachers agreed that they like the guidance provided by LightSail for choosing a book, but sometimes this selection could take away from reading time. Teachers agreed that newcomer students (students new to the U.S. and still acclimating to their school environments), benefit from Imagine Learning and use it in a pull-out class to help with language acquisition. Similarly, teachers felt Raz-Kids seems to work better for lower-level readers compared to LightSail because ELL's can both listen to text being read and read it again themselves. Two teachers mentioned ST Math, with one stating her preference for the format of the program noting:

> *ST Math has more game-like features while still meeting learning goals. The students have a certain number of 'lives' in which to meet certain goals/show mastery of skills, and when the lives are gone, they can renew them. Overall, it is good for my students to work on the computer – it is good practice for the state test – CAACPP…. The students don't hate it [LightSail] but it could be more interactive and less 'testy' feeling.*

The teacher felt that this program is more motivating than LightSail, which she felt was more punitive. She said, "Losing the points [in LightSail] is crushing" to students. However, another teacher felt both ST Math and LightSail had specific strengths. LightSail in comparison to other programs had "a main interface that is easier to use, but there are logistical issues" such as books vanishing, being kicked off when trying to access certain books, and "answers that are incorrect," among others. Another teacher stated that LightSail's embedded assessment "questions need to be clear and not so ambiguous."

Regarding differences with print books, there were varied responses. One principal explained that she likes how LightSail captured the feeling of a traditional library:

> *There is a real-time digital library available to them with just a click. Students get to anticipate which book they will read next; kids can't wait for a book to be ready for them. The anticipation of waiting for a book one really wants to read is a good thing for students.*

Teachers offered a variety of positive opinions about LightSail, including the fact that the program provides Lexile levels and allows students to see their growth over

time. Teachers also liked that LightSail monitors comprehension so the teacher can easily assess gaps. With traditional books, teachers would have to read and create questions for many books. Teachers also felt that LightSail is more technologically advanced compared to the other programs and students like to work on the computer; it feels more real world to them. The only negative comment teachers noted was that some students are more likely to get distracted on the computer and they get more deeply involved when reading a paper book.

Preparation to implement. Principals, coaches, and teachers were asked during interviews and focus groups whether or not they felt adequately prepared to implement LightSail, and responses varied. Overall, respondents believed that it was easy to learn how to log into LightSail and to teach students to do the same. Dealing with technical glitches, though, took time away from learning to use the program at a more refined level. One principal also spoke of a lack of buy-in among teachers that affected the impact of the introductory PD: "I sat in on the first training and it made sense to me, but not everyone bought in initially, and so they did not retain the information. Once people started trying it, more people started buying in."

Participants described two ways in which they received introductory PD to use LightSail. First, a one-day districtwide PD session was held, and for those who could not attend, LightSail representatives worked out a series of phone and/or video conferences. One school reported that their training consisted of a phone conversation with a LightSail representative. During this call, teachers worked on their Chromebooks while the representative walked them through the process, letting the teachers try out program features. One teacher from this school noted, "It was pretty simple to figure out how to get started." At another school, teachers and the literacy coach attended the large PD with other OUSD schools. They reported frustration that the experience was not authentic, preferring to have had their own student data and personal IDs available for practice. At a third school, the teachers and literacy coach also expressed frustration with holding an off-site, school day PD:

> *The PD was offered during the school day and the school had no resources to pay for subs. It is also hard for the teachers to be out of their classrooms; the student's need the consistency of having their teacher every day and problems arise when subs are inserted into a high needs environment.*

In this case, the literacy coach did cover a class in order for one teacher to attend, but this meant that this teacher had to find time to train the other teachers and use her personal preparation time to plan her presentation. The coach explained that asking a teacher to give up personal time of any kind was not a usual or favored practice for this administration.

Conversely, some teachers felt that they had to learn LightSail by trial and error, and then share results with each other. They also felt there were many nuances they

did not learn about during initial training, for example, how to use ThinkFeed. Teacher comments reflected that follow-up PD sessions after they used the program for several weeks would have helped them and that although PowerPoints and screen shots were helpful, teachers would like to have short videos of the program in action in real classrooms.

Nearly all of those interviewed commented that teachers were not prepared to integrate LightSail fully into classroom instruction, particularly in dealing with how to use advanced program features such as ThinkFeed, annotating text, and using the teacher dashboard. Participants at two schools also noted that the selection time for procuring books for the digital library was inadequate. One teacher explained:

> *Now we wish we had more time to choose books – we are afraid that we bought the wrong books. We tried to buy the full gamut of books with our start-up money but there was a lot we didn't know about which books and how many at each level we would need.*

Participants expressed a need for more LightSail PD on how to best to use the program in their classrooms. One teacher commented that training over a period of time would be most beneficial.

School implementation. In terms of the involvement of administrators with LightSail implementation, most principals indicated very little involvement on their part due to time limitations and the fact that the program had only been in place, at most, for five weeks in the schools. Principals did note that they delegated responsibility for pedagogical and technical support and two of the three principals stated they would like to be more involved. One principal commented that she saw her role as "making sure everyone knew what to do and then I passed it off to the learning coach. I make sure they (teachers) have the supports they need. I just do not have time to oversee this the way I would like."

Another principal stated she had not been involved directly this year commenting, "Next year, I will look at LightSail in use in the classrooms more regularly – we are only five weeks in [to program use] right now." A third principal went further stating, "I just got data access yesterday. I will be monitoring more and observing to see how it is being used and to make instructional decisions." In the fourth school, the coach explained that "the principal is the only administrator in the building and does not get involved with LightSail, just copied on all emails about the program."

Literacy coaches appeared to be more involved in supporting teachers with the launch and use of LightSail, some to a greater extent than others. In one school, the literary coach noted that after getting the program initiated, she is now strictly a contact person for the program. She does not have time to monitor the program, but

will cover a class if needed to allow a teacher to get help with LightSail. Conversely, in two other schools it was reported that the literary coach was highly involved. Teachers indicated the literacy coach is in charge of scheduling meetings or sharing information about LightSail, and communicating expectations regarding its use. In another school, teachers commented, "the literacy coach supports us, visits classrooms, co-teaches when needed, and helps find answers to problems." It was noted in the fourth school that the literary coach consults with teachers, organizes the book selection process, and provides schedules for teachers to meet with LightSail representatives. In all schools, literary coaches were the main point of contact for communications with LightSail. Coaches in several instances explained that they did not have any more training than the teachers did, and because teachers used the program more frequently, they were often more aware of issues. Literary coaches were initially more focused on how to get the program up and running rather than on providing on-going support.

In terms of how LightSail is implemented in classrooms, most teachers indicated that the program was used between three to five days a week for an average of 20-30 minutes per session. During this time, LightSail was used primarily for independent free reading time, as part of whole group reading instruction (as in teaching novels), or to supplement reading instruction. One of the fourth-grade teachers stated, "I use LightSail to motivate students to read more, to practice sustained reading over a period of time, and to build skills." A principal and learning coach elaborated further on this notion describing their goal in implementing LightSail as increasing students' reading stamina, or building "reading muscle."

In two schools, accessibility is an issue as there are not enough devices for every student to have one throughout the day. Device times in these schools were scheduled. One teacher commented that she "Found that it was difficult to get LightSail initiated because the school had only one cart of Chromebooks for two fourth-grade and two fifth-grade classrooms, so we must schedule carefully when they can use the computers." Another issue for implementation in one school dealt with access to data. Only one teacher has automatic sign-in access to the data generated and the other teachers have to go through an arduous process. They would like to be able to track students' progress towards achieving standards easily and on a regular basis.

Implementation of LightSail in the classroom. Distribution of Chromebook devices was observed in about half of all visits and was characterized by well-rehearsed routines in which students moved through the process independently. In the other half, devices had already been distributed before the observation began. Logging on, downloading, and opening the LightSail program was problematic for at least several students in each classroom, leading to an inefficient use of time. Some students and teachers reported slow downloads of the program or text most of the time, with many

students plagued by repeated unexpected logging off that used up to 10 minutes or more of a 20- to 30-minute reading period.

Teacher activities. A variety of activities was observed during dedicated independent reading time within the classrooms. In all nine classes, only LightSail was used during observations; no students were observed reading paper books. Predominant teacher activities across all classrooms included:

- Monitoring for on-task behavior
- Facilitating students' use of the program
- Solving technical problems
- Conferencing with students using the program to check reading comprehension, prompt deeper thinking about the text, or assist students who needed to clarify text
- Conferencing with students related to applying strategies learned during the reading of the whole class or differentiated reading group book.

During eight out of nine observations, teachers actively monitored student progress by conferencing with students, asking questions about what they were reading and asking them to explain how they solved comprehension problems. In the remaining class, the teacher moved around the room twice to watch students and to intervene as needed – redirecting, solving technical problems, and giving feedback regarding how the student was interacting with the text. The remainder of the time she observed students from her desk while attending to other tasks. The teachers at one school attempted to send questions to students via ThinkFeed but encountered technical difficulties.

Student activities. Almost all students were observed reading independently, attempting to find appropriate reading material, or checking on their badges. Student engagement was consistently high, with almost all students working hard to read, understand, and relate to their books. When asked informally, students reported that they like reading on the computer and that they like having a variety of genres from which to choose.

Overall, students progressed well regardless of their reading level. Many students were classified as ELLs or had recently been reclassified as no longer an ELL, but almost every student was observed working hard to overcome challenges with vocabulary or background knowledge. Students were extremely interested in tracking their progress and were anxious to earn badges and trophies. When they perceived inconsistencies between their reading performance and the LightSail progress monitoring and rewards system, reactions ranged from disappointment to distress.

Challenges with implementation. A variety of implementation challenges were observed in classrooms, as well as conveyed during interviews and focus groups.

The implementation challenges in OUSD appear to center on three areas including (a) lack of time for PD, (b) technical issues, and (c) the digital library.

Lack of teacher knowledge. All participants indicated that additional PD would help teachers address a variety of issues in fully utilizing LightSail. Interviews and focus group responses indicated that PD had been somewhat uneven for participants. In schools where high needs students require consistent daily instruction, and the school system lacks an ample pool of highly trained substitute teachers as well as funding for them, appropriate timing must be a consideration for planning PD. Although this topic came up in a variety of discussions, one learning coach offered a solution:

> *In a perfect world, a highly-trained instructor from LightSail would come in and demonstrate how the program works with each class, for a day. Even better, if two instructors could come in, one could model the whole class instruction while the second could circulate and work with students individually or in small groups to teach them how to use the program.*

Technical issues. Observations, interviews, and focus groups revealed a variety of technical issues including troubles with logging on and staying logged into LightSail, data reporting issues, and the digital library.

- ***Devices.*** All classes in OUSD used Chromebooks exclusively. The most common problem witnessed during observations and mentioned in interviews was logging in and staying logged in. Students and teachers became very frustrated when more time was spent waiting for text than reading it. Students were frustrated by glitches when they tried to read; one student wrote, "Every time I try to check out a book it freezes and it tells me questions before I read the book." Students were distraught when they lost all their points earned in a book because of one missed cloze item, and they were also frustrated when they missed a cloze item but did not receive feedback from the system to help them correct their mistake. Finally, students were confused by comprehension questions that appeared along with the title page of a new book.

- ***Reporting.*** Teachers and coaches had trouble using the data reporting features in LightSail. In one observation, the teacher had trouble with her Chromebook and therefore could not communicate with students via ThinkFeed, or track student progress. In another instance, a teacher reported: "Only one teacher has access to student data, as only one person is listed as the administrator. It seems like we should all be able to access this data."

  This was very frustrating to teachers. Updating the system with new class data was also time-consuming, taking as much as 24 hours. Another issue

was inconsistent data reporting. For example, a student completed a task successfully but this did not show in his report. The teacher had no way to correct this issue.

- ***Digital library.*** Teachers and coaches expressed concern about the number of copies of particular texts, the costs of popular texts, and the lack of guidance they received from LightSail during the text purchasing process. Teachers expressed interest in learning how to override the Power Challenge process and assign texts to certain students based on a common class assignment, to differentiate instruction for very low-level readers, or to meet the wide variety of needs presented by the ELLs in the Oakland school system. A specific example with a digital library challenge involved a teacher who attempted to assign a common article recommended by a student. In this instance, the teacher directed students to choose a non-fiction article of personal interest. One student found an article about Cesar Chavez and because California was celebrating a day in his honor later in the week, other students were excited to read the article as well. The teacher tried to assign the article to everyone but most students were not allowed access.

Implementation successes. The OUSD schools had only used LightSail for no more than five weeks at the time of the observations. Despite little experience with the program, teachers were consistently familiar with program features, were proactive in their approach to using the program with a very diverse group of readers, and persisted despite technical problems or lack of formal PD. Across all four schools, regardless of reading level, students were eager to read and persisted through technical difficulties. Students were generally keen on knowing about their own progress making comments dealing with their appreciation of how "the book tracks where you left off," and that "cloze answers make my badges increase."

The students also looked forward to actually earning badges; one student stated, "We all love to earn badges." They responded positively to observers about reading text on a screen as well as reading a paper book. Students in one class were managing the system so well that they were in the running for reading the most books in the Oakland area. They were extremely proud of their accomplishments and were eager to share information about what they were reading, what else they would like to read, book ratings, and writing down their personal thoughts. Teachers reported regularly that the program provides quality non-fiction texts that were of high interest to students.

Overall impressions. Students were highly engaged, enjoyed reading, and with their teachers' support and encouragement, were able to track their own progress, set goals, and persist to meet these goals even when technical issues slowed them down. The diverse student population in OUSD provides more information about how LightSail functions in a class of students with complex schooling histories. For example,

some ELLs are fluent in their native language, L1, but are not yet on grade level and fluent readers in English. For some students with interrupted schooling or little to no formal schooling, teachers tried to use LightSail creatively to meet their needs by directing them to specific texts that the program did not select for them. As these students emerged from the Newcomer Program, their reading teachers attempted to use LightSail as one strategy in an arsenal to build vocabulary and knowledge of written English and listening comprehension. Some students who started the school year as ELLs had been reclassified by the time of this visit and were no longer considered ELLs for accountability purposes. LightSail served to support their continued development of vocabulary, background knowledge, and understanding of other cultures. However, teachers reported the need for more job-embedded PD, a greater variety of texts at low reading levels, and solutions to alleviate the technical glitches slowing students' progress, in order for them to use LightSail to its fullest potential.

Preparation and Support for Implementation

In the following sections, we present results from the teacher survey to describe the preparation and support for LightSail implementation. While specifics were presented within individual case studies, this section also includes a synthesis across sites regarding preparation and support.

As conveyed in the previous case studies, most teachers attended a two to three hour PD session to learn how to get started. In several schools, teachers could not attend and LightSail staff used a "train the trainer" method with literacy coaches or librarians serving as the school's trainer, or conducted a short remote training with the teachers and coaches.

Survey responses from EPS and DPS indicated some concerns regarding preparation and support for implementation (see Figure 1). Roughly half disagreed that it had been easy to integrate the program into their lesson plans. These results may reflect survey responses indicating that fewer than half (44.6%) of teachers in both districts indicated agreement that they felt prepared to implement the program and the minority (28.4%) conveyed that they had received sufficient technical support. There were not statistically significant differences between DPS and EPS teacher responses.

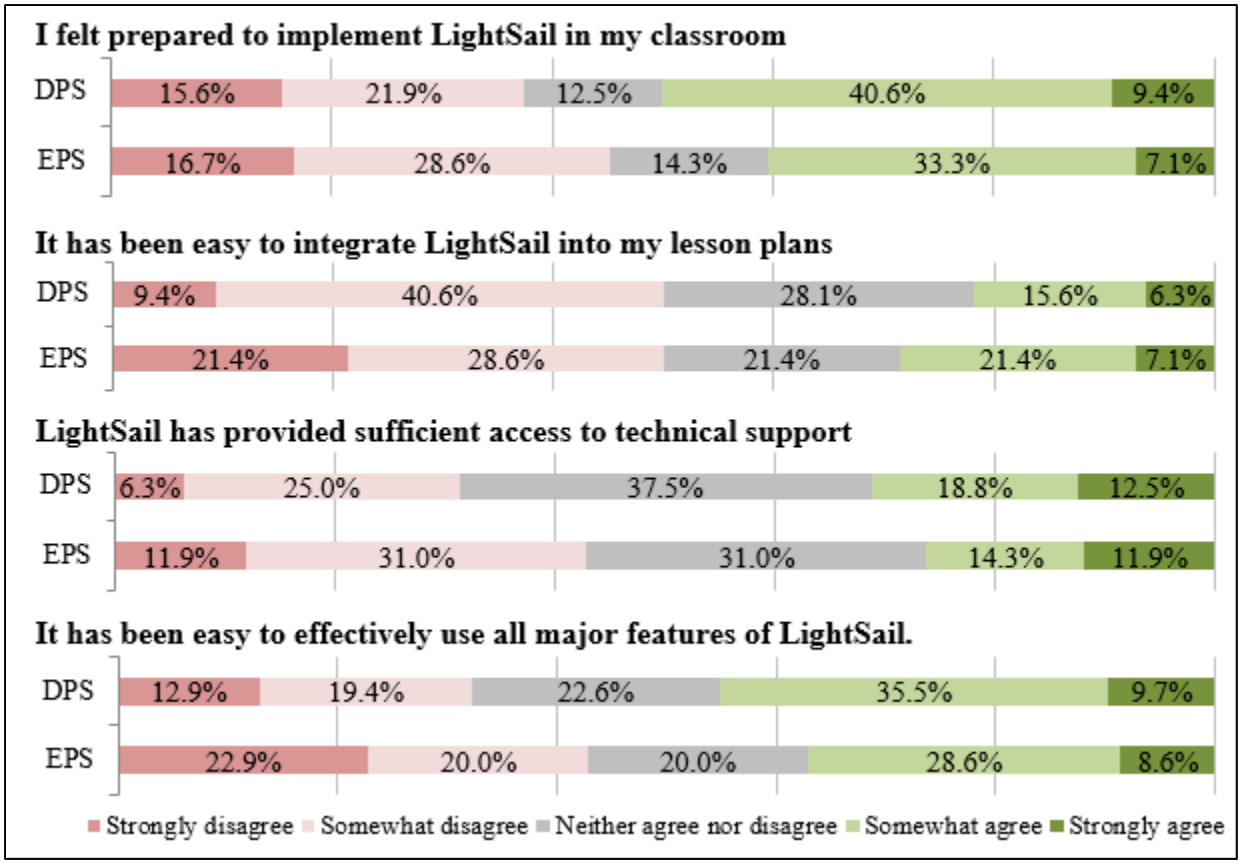

Figure 1. Teachers' responses to survey questions regarding preparation and support for implementation.

Administrators, coaches and teachers at case study sites explained that they felt ready to get LightSail up and running in its most basic form, but they felt ill prepared to implement the program at a refined level. For example, they were unanimous in reporting that they felt prepared to log into LightSail, to teach their students how to log in, take the initial assessment to establish a beginning Lexile level, to choose an appropriate text, and begin reading and tracking their growth. However, the teachers we observed using program features like ThinkFeed, assigning texts and tasks, or who had taught their students to set goals and track Lexile growth, reported using planning and personal time to investigate the program, trial and error, or had benefitted from other teachers' discoveries. These teachers were a small minority of the entire sample. In most cases, school coaches helped teachers launch the program and served as the point of contact for the LightSail support person. Administrators, with a few exceptions, were not actively involved in start-up or on-going support of LightSail other than making resources available to purchase texts and setting expectations for use. Several school staff members attempted to track student growth by classroom but were mostly unsuccessful because of unfamiliarity with the tracking features, or problems with accessing dashboard data. Further, teachers and coaches reported problems with setting up more than one person to view the data.

In terms of actually integrating LightSail into reading instruction, nearly all participants reported feeling unprepared and under supported. Teachers asked for on-going, job embedded PD delivered incrementally in short segments that included modeling of best practices. A handful of teachers used the online videos and PowerPoint presentations, and recommended that LightSail develop more of these on a wider variety of topics. Finally, teachers and coaches would like to have more support during the book selection process, and with technical glitches. When teachers or coaches had time and opportunity to contact LightSail for technical support, they found the staff very responsive. In order to get answers, teachers had to ascertain and write up the details of their problems, then involve the point of contact at their school (coach or librarian). Most teachers did not have time for this process. In addition, teachers reported the need for "in the moment" technical support and the need to know how to trouble shoot and teach simultaneously.

LightSail Implementation

In the following sections, we present results from LightSail usage data and the teacher survey results to describe implementation of LightSail within the three districts. This section also includes a synthesis across sites regarding program implementation.

Usage data. Usage data were collected from LightSail for the 2016-17 school year. Data were obtained from 1,826 students across DPS (n = 687), EPS (n = 719), and OUSD (n = 420). EPS is in the second year of implementation of the LightSail program and fifth-grade student data were collected whereas DPS and OUSD are in the first year of implementation and fourth-grade student data were collected. School-level usage data for each district is presented in Appendix H.

Reading time. Overall, students in 2016-17 used the LightSail program for an average of 90 school days during the 2016-17 school year, with the average school year consisting of 179 days. Across all three districts, the average time spent reading each day was substantially lower than the specified 30 minutes per day for full implementation of LightSail. In general, DPS students achieved the greatest amount of reading time (see Figure 2).

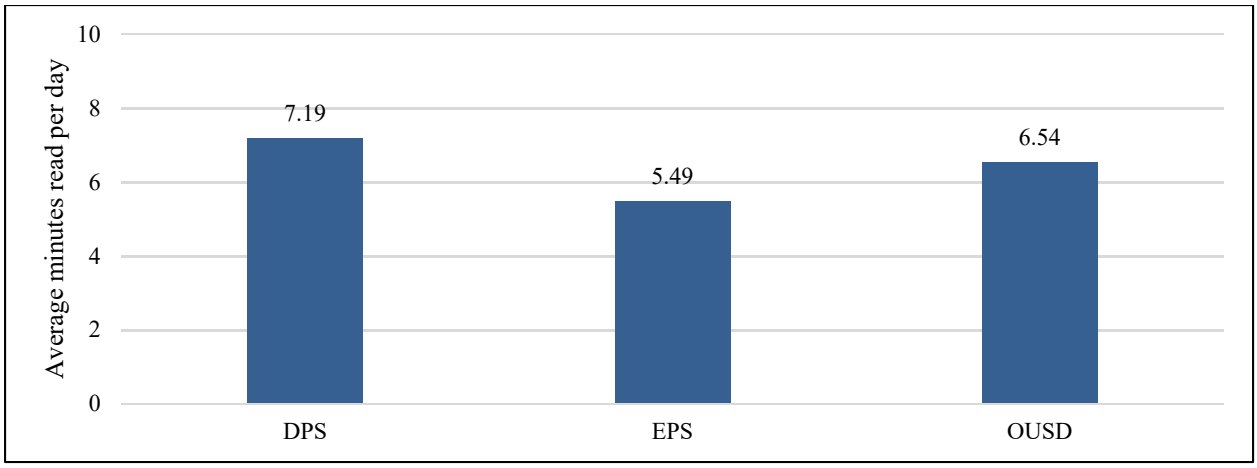

Figure 2. Average minutes spent per day in LightSail during the 2016-17 school year.

- ***DPS.*** The mean number of total minutes read in DPS for the 2016-17 school year was 768.68 (*SD* = 833.48) over 113.0 active school days of a 174-day academic calendar. That is, students read on LightSail for roughly two-thirds of the days during the 2016-17 school year. The mean total minutes read per day in DPS was 7.19 (*SD* = 5.95), with students at two schools (Columbian and Trevista at Horace Mann) reading above the district average with 13 minutes per day, while students at several schools (Asbury, Ashley, and Southmoor) read an average of only 4 minutes per day. Unsurprisingly, schools with lowest total minutes read and lowest minutes read per day also used LightSail for the least number of active school days.

- ***EPS.*** The mean total minutes read in EPS for the 2016-17 school year was 407.49 (*SD* = 602.64) over 89.5 active school days of a 184-day academic calendar. Thus, students read on LightSail for just under half of the days during the 2016-17 school year. Comparatively, students read on LightSail over two-thirds of days in the 2015-16 school year. The mean total minutes read per day in EPS during 2016-17 was 5.49 (*SD* = 4.45), with students at three schools (Illahee, Image, and Orchards) reading an above average 7 minutes per day, while students at several schools (Harmony, Marrion, Riverview, Sifton, and York) read an average of only 3 minutes per day.

- ***OUSD.*** In the 2016-17 school year, mean total minutes read in OUSD was 337.39 (*SD* = 314.36) over 54.1 active school days of a 180-day academic calendar. OUSD began implementation later in the school year than anticipated, resulting in students reading under one-third of the days in the school year. The mean total minutes read per day in OUSD was 6.54 (*SD* = 4.73), with students at three schools (Discovery Academy, MLK Jr., and Think College NOW) reading above the district average with 9 minutes per day, while students at two schools (Bridges Academy and East Oakland Pride) read an average of only 3 minutes per day.

OUSD students completed the most books (*M* = 26.76, *SD* = 32.40) as compared to DPS students (*M* = 21.80, *SD* = 31.39) and EPS students (*M* = 9.55, *SD* = 22.64). Also, though at least 96.0% of DPS and OUSD students completed a LightSail Power Challenge, only 79.0% of EPS students completed a Power Challenge.

Lexile growth. In terms of Lexile scores, several factors were measured: starting Lexile score, current (i.e., ending) Lexile score, and Lexile growth. As displayed in Figure 3, EPS students not only started at a higher Lexile score than students in the other districts, they also exhibited greater Lexile growth (*M* = 103.99, *SD* = 141.12) as compared to DPS (*M* = 58.76, *SD* = 153.55) and OUSD (*M* = 33.31, *SD* = 121.41). This is an interesting finding given that students in DPS spent more time reading within LightSail, though EPS students exhibited greater growth. However, maturation alone may explain the Lexile score changes and the reader should interpret these finding with caution.

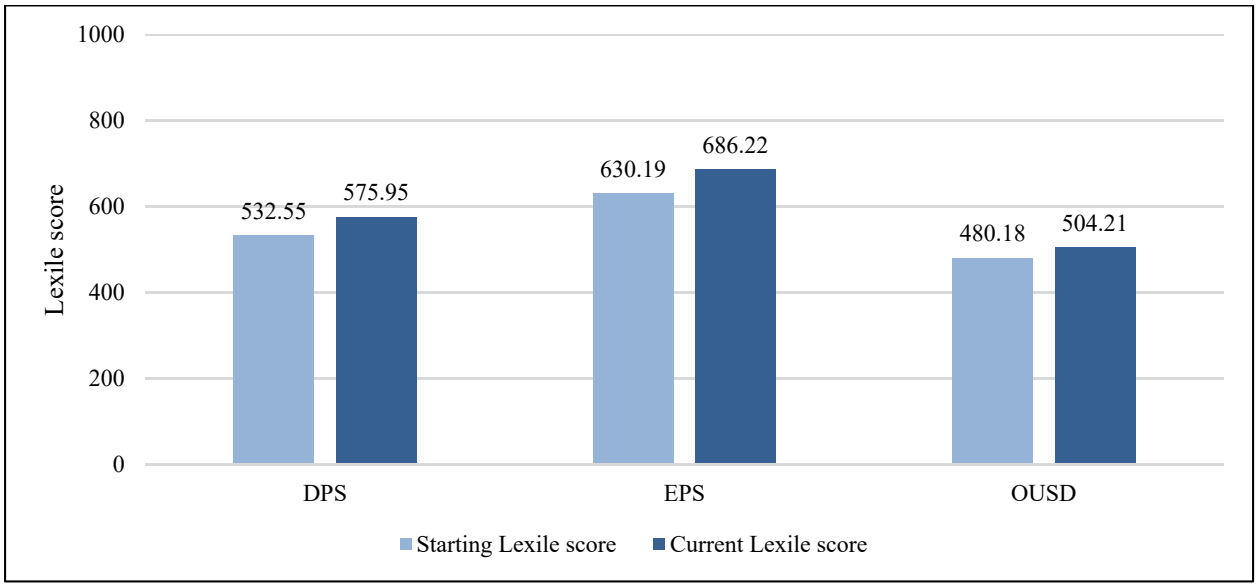

Figure 3. Starting and current Lexile scores for students within DPS, EPS, and OUSD.

Assessments and feedback. Students and teachers engaged in several assessment measures and feedback activities including short-response questions, multiple-choice questions, and annotations. While multiple-choice questions were automatically scored by the program, teachers scored students' short response questions and responded to annotations. Two assessment measures were averaged for student usage: short-response questions and multiple-choice questions. In general, assessment averages were nearly even across all three districts, though EPS students demonstrated slightly greater assessment average scores.

- ***Short-response questions.*** DPS students on average responded to a greater number of short-response questions (*M* = 5.95, *SD* = 8.16) than students in OUSD (*M* = 3.22, *SD* = 4.30) and EPS (*M* = 2.83, *SD* = 5.78). However, OUSD

teachers graded more of these responses (32.30%) as compared with EPS (23.67%) and DPS (9.75%) teachers. EPS students' average score (M = 0.39, SD = 0.13) was slightly greater than DPS students (M = 0.33, SD = 0.11) and OUSD students (M = 0.32, SD = 0.11).

- ***Multiple-choice questions.*** Results were also similar for the multiple-choice average scores, with EPS students achieving a slightly higher average (M = 0.60, SD = 0.26) than DPS students (M = 0.52, SD = 0.21) and OUSD students (M = 0.49, SD = 0.23).

- ***Annotations.*** The number of student annotations and teacher feedback responses were also measured. DPS students made almost twice as many annotations (M = 3.09, SD = 11.26) as EPS students (M = 1.56, SD = 4.77) and OUSD students (M = 1.70, SD = 6.87). EPS teachers provided more feedback (23.72%) than OUSD (2.94%) and DPS (1.62%) teachers.

Perceptions of implementation. In contrast to findings from the usage data, most teachers at case study sites indicated that LightSail was used between three to five days a week for an average of 20-30 minutes per session, primarily in an independent, free reading time, as part of whole group reading instruction (as in a workshop model), or to supplement reading instruction. One of the three districts used LightSail during a 60-minute core reading period, in which students rotated through teacher-led, small group instruction, and independent reading using LightSail. About two thirds of all teachers made paper books and other reading programs for low-level readers available during these sessions. About a quarter of all teachers indicated that they incorporated LightSail into instruction outside of independent reading time such as content area instruction, Spanish instruction, or in conjunction with writing activities.

DPS and EPS teachers conveyed their degree of use and reactions to various LightSail features through survey items (see Figure 4). Responses overall indicated that, within both districts, less than half of teachers indicated at least occasional use of these program features and with one exception (assigning a common book), use was comparable between districts. These findings reflect that teachers may have had little involvement with the program while students read on the platform. Though rare in both districts, DPS teachers were significantly more likely to assign a common book to all students or a small group of students (22.6% at least occasionally) as compared with EPS teachers (2.8%; $p < .001$).

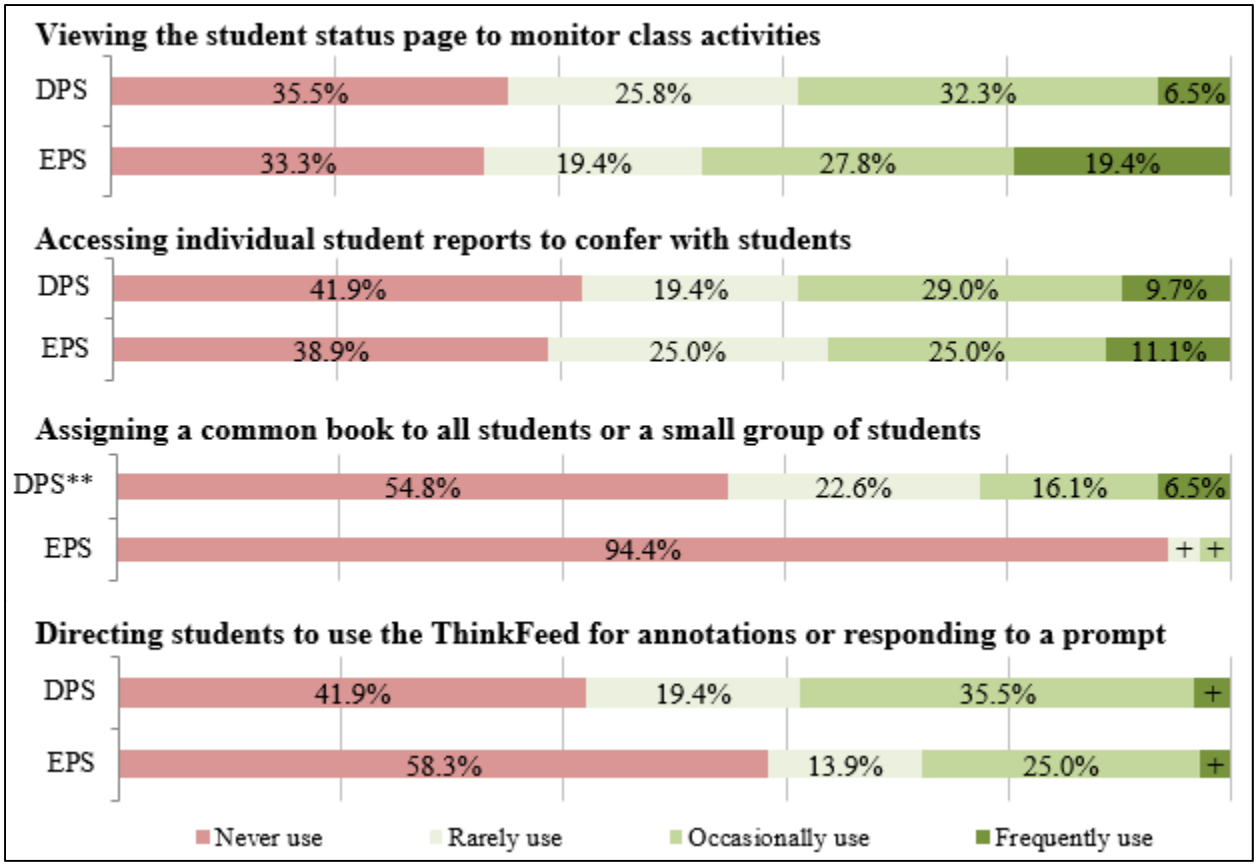

Figure 4. Teachers' reported frequency of use for LightSail features.
Note: + < 5.0%; **p < .001

In terms of rating the effectiveness of these program features, the majority of teachers that did use them conveyed that they were at least somewhat effective. Perceptions were most positive for teachers' ability to access individual student reports for conferring with students regarding their progress (72.5% of teachers indicated at least somewhat effective). Just under two thirds of teachers indicated that the student status page and use of ThinkFeed were effective. While few teachers indicated using LightSail to assign a common book to students, the majority that did in DPS indicated neutrality as to whether or not it was effective and the two teachers in EPS that used this feature reacted favorably.

At least one third of teachers within DPS and EPS indicated not using these program features. The predominant reasons for not using them included that teachers did not know how to use them or that they were not aware of the program features. These findings may relate to the perception by teachers that they were not adequately prepared to implement the program and may not have received sufficient professional development.

Student Engagement

Several questions on the student survey asked about their impressions of using LightSail in terms of ease, engagement, and reading interest (see Figure 5). Across both EPS and DPS, almost two-thirds of students indicated agreement that the LightSail program was easy to use. However, DPS students were significantly more likely to agree (49.7%) that LightSail was fun, engaging, and interesting as compared with EPS students (44.7%; $p < .05$). Though a greater percentage of DPS students also indicated that LightSail improved their reading interest (47.0%) as compared with EPS students (39.8%), the difference was not statistically significant.

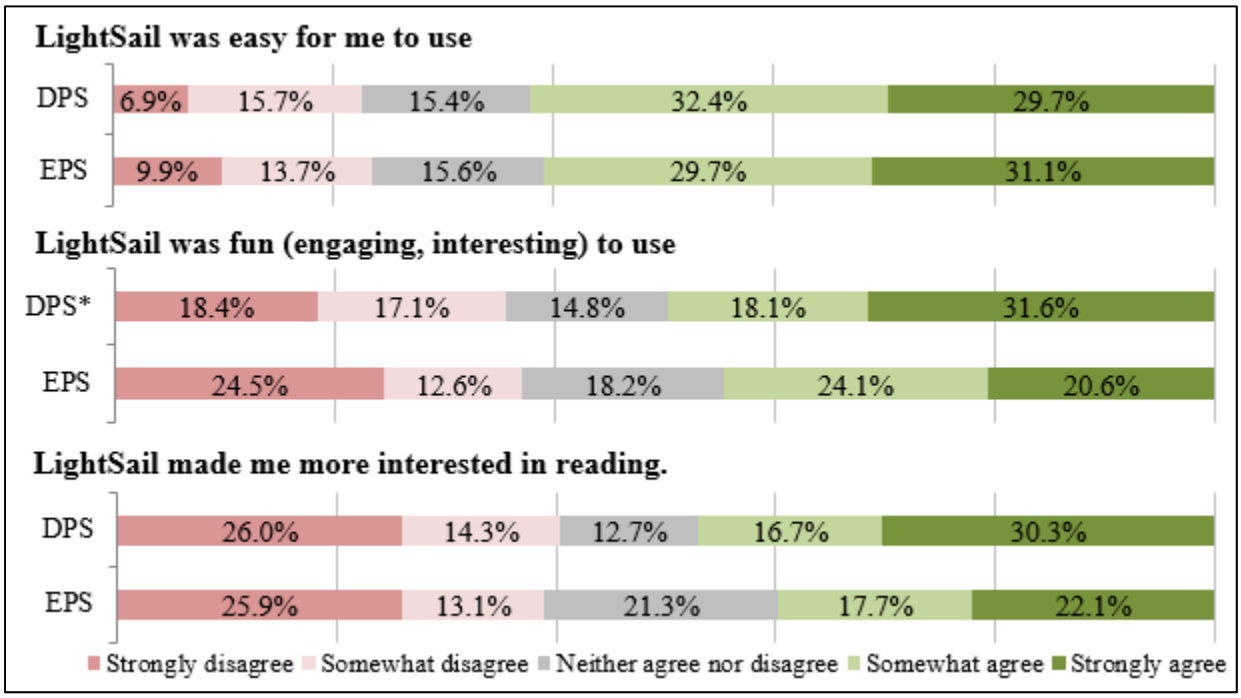

Figure 5. DPS and EPS students' survey responses regarding engagement with LightSail.
Note: * = $p < .05$

Teachers in DPS and EPS also responded to a survey item regarding their perceived impact of LightSail on student engagement. As with student survey results, DPS teachers were significantly more likely to agree (74.2%) that the program is engaging for students as compared with EPS teachers (51.4%; $p < .05$).

Principals, teachers and coaches at site visits, though, indicated that students enjoyed LightSail when they did not encounter technical issues and when there were books of interest available. All groups felt that overall students were excited, motivated, and that students enjoyed the alternative approach to reading print books. Badges were seen as motivational for students who enjoyed attaining these as a mark of progress, and class and school competitions also provided incentives to students. However, in almost every group it was also noted that students became easily

frustrated if they were not growing or earning badges, or faced with problems that could not be readily addressed. A key piece in student enjoyment may also lay in teacher presentation. One coach explained, "There is an impact between how excited the teacher is and whether the kids enjoy it. If teacher is excited, the kids are excited."

Student Learning

Several student survey questions inquired about how the program impacted learning, as well as the personalization of LightSail to students' individual learning needs. As displayed in Figure 6, DPS students tended to be more positive than EPS students regarding the perceived impact on their learning. For example, DPS students were significantly more likely to agree that LightSail improved their learning as compared to EPS students ($p < .001$). Similarly, a greater percentage of DPS students agreed that LightSail helped them improve their test results as compared to EPS students ($p < .05$). Notably, only 35.2% of DPS students and only 28.8% of EPS students agreed that LightSail improved their test results. Further, over half of students across both districts agreed that LightSail was academically appropriate to their level. Though there was distinction between districts regarding whether the program adequately addressed student learning preferences, results were not statistically significant.

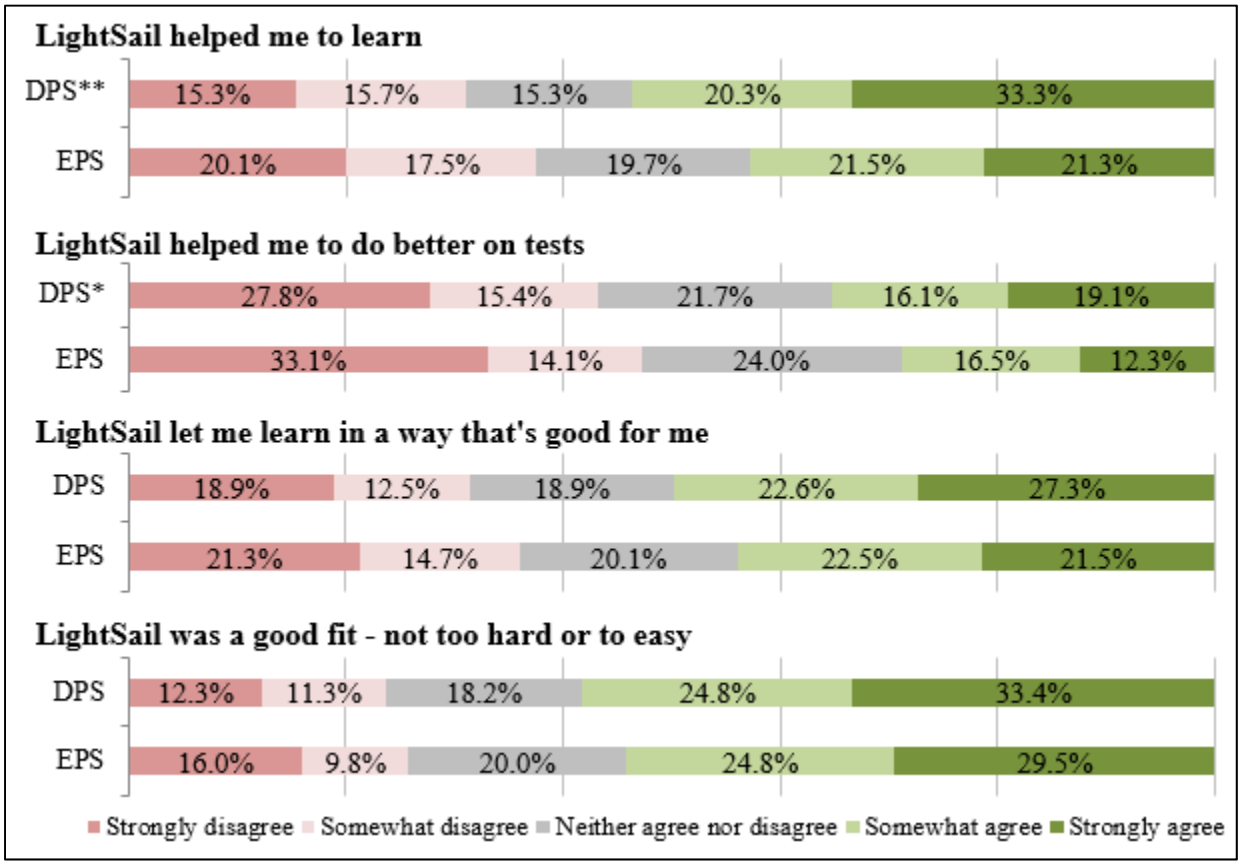

Figure 6. Percentage of DPS and EPS students responding by level of agreement to LightSail Student Survey Spring 2017 learning questions.
Note: * = $p < .05$; ** = $p < .001$

Teacher survey responses were somewhat consistent with student reactions (see Figure 7). While teachers in DPS and EPS offered comparable perceptions of the program in terms of promoting personalized learning (74.2% agreed), DPS teachers were significantly more likely to agree that LightSail is effective for increasing student achievement as compared with EPS teachers ($p < .05$).

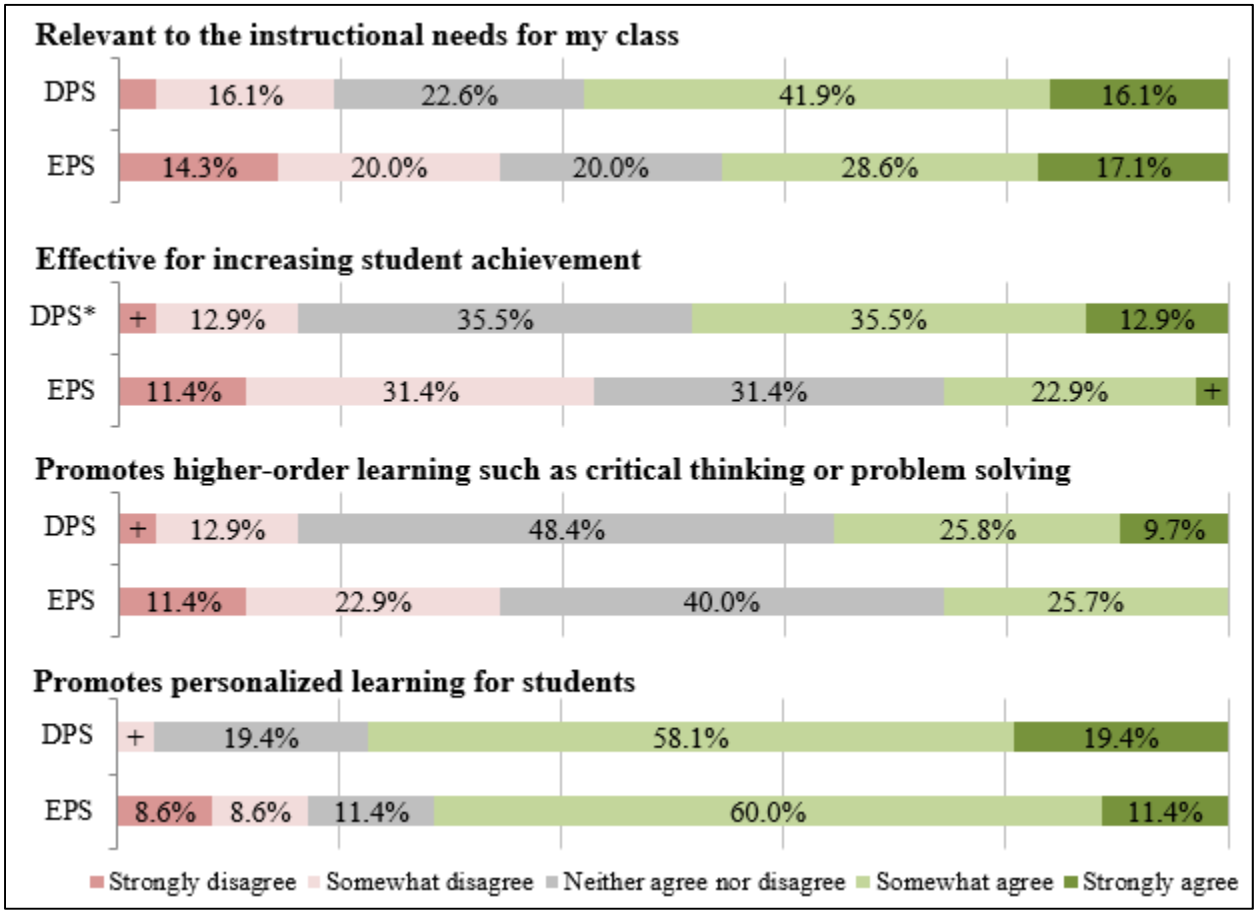

Figure 7. Teachers' responses to survey items regarding the impact of LightSail on student learning.
Note: + < 5.0%; *$p < .05$

Participants from site visits within all three districts made a variety of comments that support LightSail as beneficial in classroom. Teachers were the most likely to cite specific benefits, such as increases in independent reading time, Lexile reading growth, students developing a love for reading, having greater choice/options for reading material, higher engagement and accountability and badges providing incentive/motivation, as well as receiving prompt feedback. One teacher made a comment that summed up several responses stating, "I like the fact that it gives them

so many options, and they look forward to how Lexile scores may change; students like choices, getting feedback faster than I'm capable of giving and it is motivational for reading." However, teachers also noted that in several instances, not enough time had elapsed since implementation to clearly "differentiate benefits and if those benefits were solely a result of LightSail."

Principals also cited some of the same benefits as teachers, particularly increases in independent reading time, and higher engagement for students in reading, but as with teachers, noted that "LightSail does not live in isolation" and it was difficult to determine if these benefits were primarily a result of LightSail use. Principals also commented that not enough time had elapsed to see the full benefit of the program.

Several coaches also mentioned the benefit of having multiple choices and options for reading materials. One coach explained that because the school had committed to the program, student reading time had increased, and this seems to have been a key program benefit. Coaches noted that giving students a variety of choices had also improved engagement and made students more excited about reading. Although the majority of coaches' responses were more concerned overall with technical issues (e.g., access, connectivity, app downloading), and the need for more teacher training that impacted implementation, there was an overall belief that the program had potential. One coach summed this up by stating, "I don't know that I've seen a direct correlation with achievement but at the end of the week with 200 minutes of reading how could that be a bad thing?"

When queried as to whether LightSail had a positive impact on student growth, the majority of teachers, principals and coaches in the three districts were hesitant to comment. They either felt that it was difficult to tell if LightSail was solely responsible for any growth achieved as most schools/districts had multiple initiatives in place or that not enough time had passed to see if there were any substantive improvements in student achievement. This hesitation to attribute student growth to LightSail may also relate to perceptions regarding whether the program was meeting the needs of most students. Across site visits in the three districts, the majority of respondents felt that the program did not effectively meet the needs of lower-level readers due to a lack of appropriate reading materials, and consequently some students "cannot grow." One teacher summed up a variety of comments stating, "Students at or above their grade level in reading are supported with a broad library of options. Those that are below reading level, though, cannot access books of interest."

A second comment consistently noted across groups was the need for more guidance from LightSail regarding the acquisition of appropriate books. One coach commented, "I wish they could sell the books in big packs labeled for beginner, intermediate, advanced readers at various grade levels." A principal further noted, "Our challenge has been that it [LightSail] matches [student needs] only as much as we've purchased the right titles." The principal found it challenging to find appropriate books

for all students at each Lexile level and there were some language barriers. She explained, "For instance, ESL students don't typically use LightSail, as there aren't as many titles available."

Overall Perceptions

Students in DPS and EPS provided their reactions to LightSail through survey responses, which are presented below. Following student reactions, educator (e.g., teachers, literacy coaches, and principals) reactions are presented.

Student reactions. Students were asked whether they would like to use LightSail in the future and responses between districts were fairly consistent. Just under half of DPS (46.5%) and EPS (42.2%) students indicated agreement. Students were also asked through open-ended survey questions whether they liked using LightSail, what they liked best, and what features they liked least. Students in DPS and EPS shared similar opinions about the LightSail program. As such, their responses have been aggregated in the following subsections.

Program perceptions. Averaged across both districts, 46.9% of students stated they liked using LightSail, while 37.7% of respondents did not like using the program (15.4% provided no opinion or stated they did not use the program). One of the most referenced reasons in both districts for why students like using the program is that it helped them improve their reading and knowledge: students read more frequently using LightSail, and they felt they learned more using LightSail. One student summed up this sentiment by stating, "I like using this program because it helps me learn and gets me interested in reading." Another student offered: "I liked using this program because it let me read the books I wanted to read and it asked me questions while I was reading the book and that helped me get more engaged and understand the book."

Students also frequently referenced the broad choice of titles, allowing student choice across a range of genres. As one student noted, "I liked using this program because I could read more different books that I don't have." Another student stated, "I do like using this program because it helps me learn about different things in different kinds of books."

Some of the other frequently mentioned reasons for why students liked using LightSail were that the program was easy to use, it was fun to use, and it was challenging. Regarding the challenging aspect of LightSail, one student articulated,

The reason that I liked this program is that it helped me and could obviously help me in the future. For example, it helped me understand the book I was reading by giving me problems that was about the content in the article. I would be glad to use this program again.

Several students also noted that the program helped improve their English-language reading ability and fluency.

Reasons for why students in both districts did not like using LightSail most frequently centered on technical issues: login errors, long load times, and frequent crashes. One student stated, "I didn't really like it because it had too many glitches, even on the Chromebook. This program needs a little more bug fixes," or as another student explained,

I did not like using LightSail because our teacher told us we had to read for 15 minutes a day but because it is so slow by the time the 15 minutes are up we didn't get to even read!

One student, noting technical issues, specifically said, "It [LightSail] crashes a lot on the Chromebooks and sometimes it takes a long time to load and it says 'device activation in progress' which blocks the ability to open a book in the program."

Students also referenced additional issues as to why they did not like using LightSail. Several students noted that if they did not read on LightSail for a week or more, their Lexile level dropped, lowering their reading level and the books available for them to read. One student commented, "I didn't like it because if you just weren't on there for a few days but still reading on regular books, your Lexile level went down for no reason," or as another student detailed, "Sometimes I am not able to do the program for a couple of weeks and that counts down my Lexile."

Similarly, students in both districts described their Lexile rating as being a barrier to reading but for different reasons. As one student said, "If your Lexile is too high, there are barely any books to choose from." Students also described a lack of interesting and available Power Texts at their level, which also limits the number of books they can access. As one student described, "You need to read a Power Text before and then I can't read the book I really want to read."

Many students also described a dislike of having to read on a screen; they preferred paper books over electronic reading. Students noted that it seemed to hurt their eyes when having to read too much on a screen.

***Most liked features*.** Several themes emerged from students' responses as to what they liked most about the LightSail program: book choice, progress mapping, and program functionality were the most commonly liked features.

- **Book choice.** As previously noted, students considered their ability to personally choose from a range of books as one of the most notable features of LightSail. Specifically, many students stated that this feature of LightSail helped them

engage with reading, as one student summed, "I can easily get trapped in a text and not want to stop," or as another student stated, "I like to learn more things that I didn't know before."

- **Progress mapping.** Students across both districts also frequently described how LightSail showed them their progress in reading. For instance, one student noted, "One thing that I like best is that it [LightSail] shows your progress throughout the year. I like this because you can see how much growth you have made," or as another stated, "I like that it shows my process so I can know what to work on," and as one student summed: "What I like is you can see yourself growing."

- **Program functionality.** Other students noted the functionality of using LightSail: "I liked how it had different tools to use. For example I believe you could take notes and find signposts." One student further detailed this design:

  The thing I liked the most was how everything was organized. On some programs, everything is on a single home page, where on LightSail there were different areas to go to, for example, there was an independent library section, and an independent home screen kind of area.

Other students also described the personalization provided by LightSail, as one student stated, "It [LightSail] is my own personal library. I love it." Several students also commented how the LightSail reading contests encouraged their reading goals: "It [LightSail] had a contest of who read the most minutes which encouraged me to keep reading longer."

Least liked features. Several themes emerged from students' responses as to what they liked least about the LightSail program: book selection, book availability, testing, and technical issues were the most commonly disliked features.

- **Limited texts.** In contrast to students who appreciated the range of LightSail books to choose from, many students in both districts disliked LightSail because there were not enough available books of interest. One student described this issue by stating, "The thing I despised the most was the fact that it gave me either a tiny amount of book choices, or books I wasn't interested in." Specifically, students noted that being forced to read Power Texts limited their selection of books, as one student noted, "I don't like that it won't let me read a book because it is not a power text." As another student suggested, "What I think needs the most improvement is that there are not a good variety of power texts to choose from." Students suggested several options for the Power Text, from eliminating them entirely, to allowing students to choose when they want to read a Power Text, to making more books available as Power Texts.

- **Book availability.** Students also often mentioned that book availability in general was a least liked feature. One of the most frequently referenced issues was that students disliked having limited copies of books, which means they had to wait to read what they wanted. One student described this by stating, "Whenever I found a book I wanted to read it said that someone was reading the book and I had to wait a long time to read it." Another offered: "I didn't like was when almost all the books you wanted to read was taken and we had to wait for 40 days till it's open." Students also addressed the limited type of available books, as one student stated, "I didn't like that when it comes to history, there wasn't much on other cultures," or as another student suggested, "What I like the least is if they had more Spanish books because I would love to read more books than there is."

- **Testing.** Another frequently mentioned issue was that many students did not want to be quizzed or tested every time they read a book. One student exclaimed, "I dislike the short responses because I like to JUST READ THE BOOK!" Another student similarly noted, "I hated when something interesting was happening then I would have to write a whole paragraph in the middle of it," or simply: "What I liked least was that you had to be tested while you read."

- **Technical issues.** Students across both districts also noted technical problems as detracting from their LightSail experience, mentioning login glitches and slow load times as the most prevalent technical issues. Several students also mentioned a lack of accessibility features to help them read, such as magnified text or changing the brightness.

Educators. Teachers in DPS and EPS were asked on the survey to comment on program likes, dislikes, and areas for improvement. Case study participants at all three districts were asked to comment on the strengths of the program, along with suggestions for improvements.

***Program likes and strengths*.** Consistent themes emerged across data sources regarding what features participants liked and the strengths of the program, which included the variety of texts, accountability and feedback, personalization, and vocabulary development.

- **Variety of texts.** The most commonly noted aspect most liked and viewed as a strength of LightSail was the variety of choices and genres students had to choose from (with the exception of lower level readers). A DPS teacher explained, "I liked how it was like a Netflix library for kids." An EPS teacher similarly noted, "I like the choices and options that LightSail gives us" while a DPS teacher noted that LightSail provided "The chance for students to read books that are not available in our libraries."

- **Accountability and feedback**. The second feature teachers commented upon most frequently they liked about LightSail was the accountability and feedback the program provided (e.g., response rubrics, short response questions, classroom at a glance reports, etc.). One EPS teacher explained LightSail provided teachers "the ability to quickly monitor student reading, track what they are reading, and evaluate growth." In addition, she noted, "students are able to see their own growth consistently." A second EPS teacher commented: "I liked that it tracked data in simple ways for them [students] to see their Lexile growth (whose progress would freeze for some students), books read, badges/achievements." A DPS teacher noted, "I most like that students are able to track their progress and can use the cloze reading checks to make sure that they are understanding what they are reading. A second DPS teacher simply stated that LightSail made it possible to be "able to monitor student reading minutes."

  Embedded assessments, immediate feedback, and reports were all seen by case study participants as real strengths within LightSail. A principal commented that teachers were better able to "provide feedback to the students, which allows them to be more self-directed and choose their reading path." One teacher also noted that not only were teachers better able to assess students' reading ability, it also "gets kids to evaluate their own learning." Accountability was also seen to result from assessment. One principal observed that students are "learning that there are consequences for their actions, and we're at the first stage of getting kids to understand that . . . it teaches them that what you do on things matters, there's a result."

- **Personalization.** A third feature that DPS and EPS teachers commented on in survey responses dealt with liking the personalization LightSail allowed as students were easily able to find and read books that were appropriate for their reading level. One DPS teacher explained, "I like how it [LightSail] is geared toward students' individual reading levels." Two EPS teachers also noted the importance of leveled texts. A DPS teacher went further into detail explaining "I like that students had to read a book at their level in order to read books that might not be at their level."

- **Vocabulary development.** The third most commonly noted strength conveyed by teachers and principals at case study sites was vocabulary development. One principal noted she was impressed with "the focus on vocabulary." Teachers cited this consistently in all groups. One teacher summed this up stating, "I love the constant . . . new vocabulary development. Because they are at students' levels, they find success."

Program dislikes. Teachers in EPS and DPS cited a number of features they disliked on the survey, but the most prevalent dealt with technical issues. Second to these concerns, teacher also noted a lack of engaging texts, and issues with tracking and evaluating student progress.

- **Technical issues.** Overwhelmingly, technical issues associated with the program were cited as a concern by the majority of teachers within both DPS and EPS. Teachers explained that the Chromebook app frequently crashed, took "an extraordinary amount of time to load" and, as one teacher commented, "If my students were given 30 minutes to login and read, only about five students in a given time could get on without assistance." A teacher explained that after contacting the district IT and LightSail technical support, the solution proposed by LightSail was to "install the Kiosk App" and "this did nothing." Teachers conveyed not feeling supported by LightSail with the technical issues experienced. A number of teachers in both groups further commented that because of these issues, they had either not used or stopped using the program as they felt it lacked reliability and resulted in student frustration.

- **Lack of engaging texts.** Teachers in both districts also commented upon text issues. These remarks included not having enough engaging books for students to check out for students at or below grade level, power texts, and bilingual texts. An EPS teacher summarized comments from teachers in both districts stating, "Students lose interest quickly when they are not able to open up new titles."

- **Tracking and evaluating student progress.** EPS and DPS teachers also noted several issues with how teachers tracked progress and how LightSail assessed students' reading levels. The first concern related to how teachers could access reports and monitor students' reading activities. Teachers conveyed that in order to do so, they needed reliable and frequent access to a Chromebook or iPad, though most often had a desktop computer within their classrooms.

  The assessments used to evaluate student reading levels was also a concern. One EPS teacher explained,

  The Lexile growth is based on a very strict Power Book evaluation process, that I don't think takes into account all of the student's reading or growth. It has a lot of holes and doesn't completely represent how they are doing. I had several students go down [in growth] or identified as not increasing their Lexile, when I KNOW their reading had significantly improved.

  Similarly, a DPS teacher noted concerns with tracking and evaluation stating:

> *I am not sold on the belief that evaluation system works or is valid. I think it would be beneficial to have a beginning, middle, end-of-year power challenge to realign the Lexile levels. In a nutshell, the minutes used and the attention level using LightSail is too inconsistent to use as an indicator of growth. I have used the progress/monitoring page as a way to push students. At this point, I don't feel I can use LightSail as an indicator of student growth.*

Teachers in both groups also commented upon several other features they disliked, such as not being able to integrate LightSail with science and social studies, students wasting too much time flipping through the library and jumping from book to book without completing the reading, as well as using "Think Feed for an open sort of chat." Finally, some concerns were expressed regarding the student interface including text that was too small and in colors that could potentially cause eye strain.

Suggested improvements. Consistent themes emerged across data sources regarding suggested improvements to the program. Not surprisingly, these themes reflected participants program dislikes.

- **Fixing technical issues.** The most commonly suggestion teachers cited on the survey and participants referenced during case study visits were to fix technical glitches. The survey comments, for the most part, were not in depth, but did include suggestions to address login and program freezing issues, program loading time, resetting student reading levels, multiple checkouts, and devising solutions for the program to work effectively on different devices. These comments appeared to be the number one challenge for effective program use. In addition, teachers wanted to be able to use the program on different devices themselves.

- **Additional texts.** All participants agreed that more high interest texts were needed across all reading levels. This included the need to "increase the number of lower level books", "letting the kids check out more books" and make "more popular titles available". It was felt that "buying access to a book should provide unlimited access to that book, so that as many kids as possible can read a specific title." In addition, several teachers commented on the need for "access to a common book for students in a particular grade level to read together . . . that is not cost prohibitive"

  Along with lower level books and more popular titles, several teachers commented on the need for more books for ELL students, as it "is difficult for them to choose books." It was observed that a translation feature might address this need. Additionally, access for students who have different learning needs (talk to text or audio books) was also cited as a need. One teacher commented, "Some of the struggling readers need audio books – more than just the ability to highlight a section to have LightSail read aloud."

- **Teacher PD.** An additional recommendation referenced by participants in all three districts was additional professional development. On the survey, a number of DPS and OUSD teachers recognized that they did not know how to use the program fully and consequently they were not implementing the program effectively. Participants expressed the desire for PD on (a) different ways to access and use data through dashboard and reports, (b) understanding how Lexile scores are determined and what activities affect score changes, (c) technical issue trouble-shooting, and (d) selecting texts for the school's digital library.

- **Student training.** Teachers suggested on the survey that LightSail offer training for students. For example, a DPS teacher suggested training "such as training/tutorials . . . so that [students] learn how to use LightSail, and all the features on their own effectively." Others expressed desires for student training on goal setting and how they may affect Lexile scores to broaden their available books. Finally, some teachers conveyed the need for LightSail to offer training on how to effectively respond to embedded assessment items. For example, an EPS teacher suggested, "it would be helpful for LightSail to have a tutorial button for each question, where students could watch a quick video on what they key words of the question mean. Words like 'compare, contrast, climax, cause, effect, genre, author's purpose; etc. could be explained by a short video. Then students could take more responsibility for their learning instead of guessing on the questions they don't understand."

- **Web-based program access.** In survey responses and during site visits, teachers consistently noted that they also needed ways to access LightSail on devices other than an iPad or Chromebook. One EPS teacher suggested LightSail "make a web based interface that is awesome. Destroy the Chrome app. My school does not have iPads for teachers. I need an interface that is on my desktop (i.e. Internet)." Relatedly, a principal stated, "Teachers are less likely to utilize reports on iPad because it's hard to type long feedback and to print reports."

As with other survey items, DPS teachers were somewhat more likely, though not significantly, to indicate that they would like to continue to use the program and that they would recommend the program to other teachers as compared with EPS teachers (see Figure 8).

Figure 8. Teachers' survey responses regarding overall perceptions of LightSail.
Note: + < 5.0%

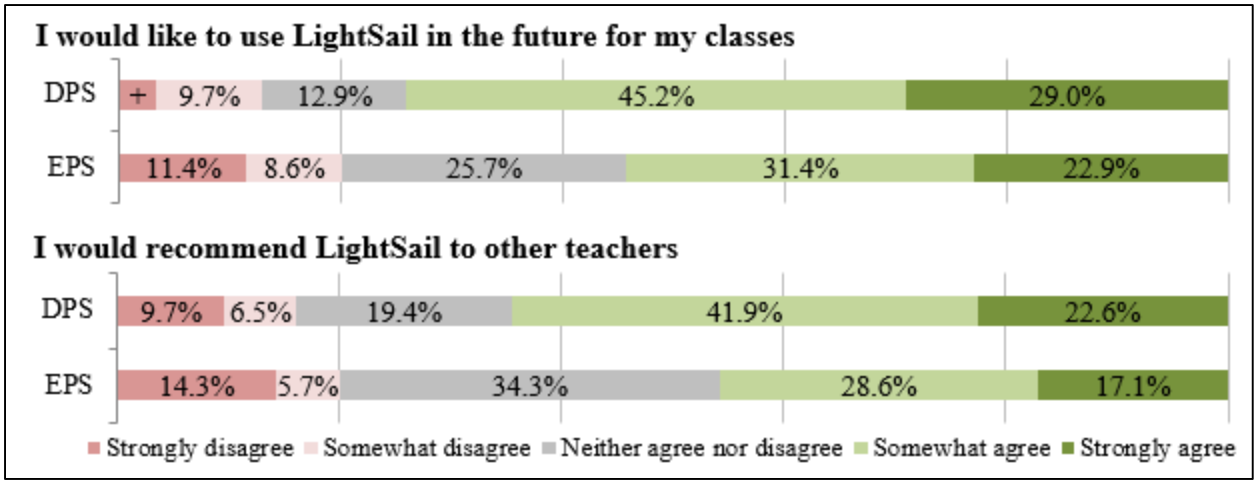

Figure 8. Teachers' survey responses regarding overall perceptions of LightSail.
Note: + < 5.0%

Consistent with survey responses, interviews and focus groups conducted during case study site visits revealed that participants were mixed as to whether they would recommend LightSail to other educators. Overall, many teachers, coaches, and principals indicated they would recommend the program if various improvements were made, such as improving the functionality of the program on Chromebooks, including more enticing books covers, and increasing the amount of PD offered to teachers.

Conclusion

In the sections below, we will synthesize and interpret results relative to the major evaluation questions that guided the study.

Implementation Practices

Results indicate that teachers in all three districts are attempting to use LightSail for its intended purpose of providing an individualized, independent, and self-selected reading experience for all students. Teachers' reported use of LightSail for reading time ranged from 20 to 30 minutes twice a week to daily with only a few exceptions. These exceptions included teachers who started out using LightSail more frequently, but because of issues with devices decided to use LightSail only occasionally, and a few teachers who use LightSail time for other subjects, such as a teacher who wanted to add more math practice time for her students. Usage data provided by LightSail, however, indicated that time spent by students on reading text were significantly less, approximately six to seven minutes. Across all three districts, teachers reported during interviews that students spent more time on progress monitoring, choosing texts, and responding to technical glitches than they did reading.

Most teachers used LightSail's most basic functions such as setting students up in the system, determining a starting Lexile level, and teaching them how to choose a book to read, and follow the assessment and progress monitoring procedures, without much outside support and with few implementation problems. At this level of use, most students and teachers were able to reap benefits such as vocabulary development from wide reading, practice with selecting multiple strategies for comprehension, and increased reading fluency unless technical glitches took away the available time for a positive experience with the program. Students who were able to choose and read books, answer questions and have their progress accurately tracked (or at least perceive that the program was accurate in checking answers), and then go on to the next level of challenge were uniformly excited about using LightSail. Teachers reported in surveys that the ability to monitor student progress on the dashboard was very important to them.

Teachers and students who moved on from the initial mechanics of the program were by far the minority, but those who did perceived the advanced program features such as ThinkFeed as valuable to increasing students' reading skills and motivation to read. A potential explanation for the very limited use of the more advanced features of LightSail may relate to participants' perceptions that professional development was insufficient. Teachers may need to receive an initial overview of the program prior to the school year, then more one-on-one coaching or modeling of the more advanced features of LightSail within their classrooms once they have mastered the basics. Further, the technical glitches and inability for teachers to access LightSail on a desktop or web-based version may have precluded their ability to fully leverage features of the program.

Participant Reactions

Teachers, principals, and coaches agreed that the LightSail schema for determining reading levels and assigning texts combined with embedded on-going assessments and communication among users works well with students who are performing at grade or close to grade level. Students who are performing significantly below grade level, ELLs, and especially students who do not assess beyond a beginning reader, are not able to easily access all the benefits of the program. In some instances, the lowest scoring students had the entire library opened to them when their score did not fit within the parameters of the program, and thus they needed more guidance from their teacher when choosing texts. Further, students expressed frustration that when they reached a high Lexile level, there were fewer reading options.

Despite technical issues experienced in all three districts, many principals, teachers, coaches, and students expressed positive perceptions of the program. Students reported widely that having many choices for their independent reading was important to them and that they enjoyed having time to read without other assignments attached. They were also universally engaged with the feedback and

rewards associated with the assessments. Teachers were also positive towards LightSail in terms of promoting personalized learning and agreed that monitoring student progress on a dashboard is useful. During interviews, several teachers explained that they would like this feature to have more functionality such as allowing multiple users to view class records. Principals liked the accountability that LightSail can provide, and the practice with trouble-shooting everyday problems on a device since state accountability systems are becoming increasingly dependent on technology.

Teachers and principals agreed that LightSail representatives were accessible and helpful when contacted for support, and that initial PD was adequate for getting the program initiated. If additional PD were offered, many teachers suggested that the timing, length, format, and content of the training be coordinated with each school to make sure that it met their needs. Teachers also preferred that more help be given with book selection and quantities at each reading level well before the deadlines for ordering titles and that teachers or literacy coaches be involved in the process. Teachers would like on-going support with this issue as their needs may change as the program implementation matures.

Concluding Perspectives

LightSail implementation was below expectations in all three districts and contributing factors appeared to involve technical issues and lack of teacher knowledge. Staging PD to begin with assistance before implementation with trouble shooting and preventing technical issues, choosing the appropriate texts in the correct quantities based on students' past performance and curricular plans, and then following-up with instruction for more refined use of program features may spur teacher interest and increase minutes for reading text. Follow-up at the conclusion of the school year to include support in purchasing more texts to respond to students' reading growth as well as incoming students, how to interpret LightSail data, and how to incorporate more advanced use of LightSail would help to encourage more robust use of the program. Such support could be supplied through a mixture of online communications, both live and prepared videos for commonly requested topics, and on-site meetings.

Teachers, principals, coaches, and students found great value in the LightSail experience. Students responded enthusiastically to the opportunity to express themselves through self-selection of texts and the option to read without interruption for a period of time. To see the growth in reading performance that one would expect to follow such high student interest in reading, LightSail representatives and teachers will need to continue to work together to find the time to communicate and remove interruptions to the learning process, and to enhance the teachers' facility with the program. With these supports in place, the program shows definite promise to provide students with an essential component in learning to read and reading to learn.

Appendix A: Principal Interview Protocol

Background

1. Let's begin by learning more about your school and your history there. Please briefly describe the school with regard to size, types of students, the community, and student outcomes. How long have you been principal there?

Implementation

2. Why did you decide to implement the LightSail program in your school?

3. How does the LightSail program differ from other ed tech programs? Or from independent reading time with paper books?

4. How is LightSail being used in your school? (example: daily independent reading time)

5. To what degree and how are you and other school administrators involved?

6. Were your teachers adequately prepared to implement the program?

Impact

7. To what degree do you believe this program benefits your school? To what degree has the program had a positive impact on student achievement (e.g. grades, test scores).

8. Would you recommend this program to other educators? Why or why not?

9. To what degree does program meet the needs of most of your students?

10. To what degree do students enjoy participating in this program?

Program Perceptions

11. What do you see as the strengths of LightSail?

12. What suggestions would you have to improve the existing program?

13. Is there anything else you would like to add?

Appendix B: Teacher Focus Group Protocol

Implementation

1. How does the LightSail program differ from other ed tech programs? Or from independent reading time with paper books?

2. How is LightSail being used in your school? (example: daily independent reading time)

3. To what degree and how other school administrators involved in implementation?

4. Were you adequately prepared to implement the program?

Impact

5. To what degree do you believe this program benefits your school? To what degree has the program had a positive impact on student achievement (e.g. grades, test scores).

6. Would you recommend this program to other educators? Why or why not?

7. To what degree does program meet the needs of most of your students?

8. To what degree do students enjoy participating in this program?

Program Perceptions

9. What do you see as the strengths of LightSail?

10. What suggestions would you have to improve the existing program?

11. Is there anything else you would like to add?

Appendix C: Classroom Observation Protocol

Comment on the following aspects of the pilot administration as applicable to the session.

1. Class Conditions:
   (Number of students, room arrangement, technology devices available)

2. Administration:
   (How product was made available to students. Learning mode—individual, cooperative, teacher-led, whole class, etc.)

3. Teacher Activities
   (Instructional, management, other)

4. Student Activities and Engagement:
   (What students did—answered questions, created learning products, researched, read, etc. Level of interest)

5. What went well:

6. What was challenging:

7. Overall impressions and recommendations:

Appendix D: Teacher Survey

Implementation

Rate your degree of agreement to each of the following survey items.
Scale: Strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, strongly disagree

1. I felt prepared to implement LightSail in my classrooms
2. It has been easy to integrate LightSail into my lesson plans.
3. LightSail has provided sufficient access to technical support.

LightSail use

Rate your (a) degree of use and (b) reactions to each of the following LightSail features.

Scale A: Frequently use, Occasionally use, Rarely use, Never use
Scale B: If A is not "Never": Very effective, somewhat effective, neither e nor I, ineffective, very ineffective. If A is "Never": Not enough time, Materials or tools are lacking, Not seen as valuable, Don't know how to use, Wasn't aware of this component, Other.

4. Viewing the student status page to monitor your class' activities during reading time
5. Accessing individual student reports to confer with students regarding their progress within the program (e.g., books checked out, completed, Lexile score change, etc.)
6. Assigning a common book to all students or a small group of students
7. Directing students to use the ThinkFeed for annotations or responding to a prompt

Overall Reactions

Rate your degree of agreement to each of the following survey items.
Scale: Strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, strongly disagree

LightSail is….

8. Easy to effectively use all major features of LightSail.
9. Relevant to the instructional needs for my class.
10. Engaging for students.
11. Effective for increasing student achievement over and above regular practices.
12. Promotes higher-order learning such as critical thinking or problem solving.
13. Promotes personalized learning for students.

14. I would like to use it in the future for my classes.
15. I would recommend it to other teachers.

Open-Ended Questions

1. What do you like best about LightSail?

2. What do you like least about LightSail?

3. What recommendations do you have for improving the program?

Appendix E: Teacher Survey Descriptive Statistics and Frequencies of Responses

Rate your level of agreement with the following statements.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree			
	%	%	%	%	%	N	*M*	*SD*
1. I felt prepared to implement LightSail in my classrooms.								
DPS	15.6	21.9	12.5	40.6	9.4	32	3.06	1.29
EPS	16.7	28.6	14.3	33.3	7.1	42	2.86	1.26
2. It has been easy to integrate LightSail into my lesson plans.								
DPS	9.4	40.6	28.1	15.6	6.3	32	2.69	1.06
EPS	21.4	28.6	21.4	21.4	7.1	42	2.64	1.25
3. LightSail has provided sufficient access to technical support.								
DPS	6.3	25.0	37.5	18.8	12.5	32	3.06	1.11
EPS	11.9	31.0	31.0	14.3	11.9	42	2.83	1.19
8. Easy to effectively use all major features of LighSail.								
DPS	12.9	19.4	22.6	35.5	9.7	31	3.10	1.22
EPS	22.9	20.0	20.0	28.6	8.6	35	2.80	1.32
9. Relevant to the instructional needs for my class.								
DPS	3.2	16.1	22.6	41.9	16.1	31	3.52	1.06
EPS	14.3	20.0	20.0	28.6	17.1	35	3.14	1.33
10. Engaging for students.								
DPS	0.0	16.1	9.7	54.8	19.4	31	3.77	0.96
EPS	8.6	20.0	20.0	42.9	8.6	35	3.23	1.14
11. Effective for increasing student achievement over and above regular practices.								
DPS	3.2	12.9	35.5	35.5	12.9	31	3.42	0.99
EPS	11.4	31.4	31.4	22.9	2.9	35	2.74	1.04
12. Promotes higher-order learning such as critical thinking or problem solving.								
DPS	3.2	12.9	48.4	25.8	9.7	31	3.26	0.93
EPS	11.4	22.9	40.0	25.7	0.0	35	2.80	0.96
13. Promotes personalized learning for students.								
DPS	0.0	3.2	19.4	58.1	19.4	31	3.94	0.73
EPS	8.6	8.6	11.4	60.0	11.4	35	3.57	1.09
14. I would like to use LightSail in the future for my classes.								
DPS	3.2	9.7	12.9	45.2	29.0	31	3.87	1.06
EPS	11.4	8.6	25.7	31.4	22.9	35	3.46	1.27
15. I would recommend LightSail to other teachers.								
DPS	9.7	6.5	19.4	41.9	22.6	31	3.61	1.20
EPS	14.3	5.7	34.3	28.6	17.1	35	3.29	1.25

How often do you use the following features?

	Never use	Rarely use	Occasionally use	Frequently use			
	%	%	%	%	N	*M*	*SD*
Viewing the student status page to monitor your class' activities during reading time.							
DPS	35.5	25.8	32.	6.5	31	2.10	0.98
EPS	33.3	19.4	27.8	19.4	36	2.33	1.15
Accessing individual student reports to confer with students regarding their progress within the program (e.g., books checked out, completed, Lexile score change, etcetera).							
DPS	41.9	19.4	29.0	9.7	31	2.06	1.06
EPS	38.9	25.0	25.0	11.1	36	2.08	1.05
Assigning a common book to all students or a small group of students.							
DPS	54.8	22.6	16.1	6.5	31	1.74	0.97
EPS	94.4	2.8	2.8	0.0	36	1.08	0.37
Directing students to use the ThinkFeed for annotations or responding to a prompt.							
DPS	41.9	19.4	35.5	3.2	31	2.00	0.97
EPS	58.3	13.9	25.0	2.8	36	1.72	0.94

How would you rate the effectiveness of the following features?

	Very ineffective	Ineffective	Neither effective nor ineffective	Somewhat effective	Very effective			
	%	%	%	%	%	N	*M*	*SD*
Viewing the student status page to monitor class' activities during reading time.								
DPS	5.0	10.0	35.0	45.0	5.0	20	3.35	0.93
EPS	8.3	0.0	16.7	62.5	12.5	24	3.71	1.00
Accessing individual student reports to confer with students regarding their progress within the program (e.g., books checked out, completed, Lexile score change, etcetera).								
DPS	5.6	0.0	22.2	61.1	11.1	18	3.72	0.89
EPS	0.0	13.6	13.6	54.5	18.2	22	3.77	0.92
Assigning a common book to all students or a small group of students.								
DPS	0.0	7.1	64.3	28.6	0.0	14	3.21	0.58
EPS	0.0	0.0	0.0	50.0	50.0	2	4.50	0.71
Directing students to use the ThinkFeed for annotations or responding to a prompt.								
DPS	0.0	5.6	38.9	50.0	5.6	18	3.56	0.70
EPS	6.7	13.3	6.7	66.7	6.7	15	3.53	1.06

Why do you never use this LightSail feature?

	Not enough time	Materials or tools are lacking	Not seen as valuable	Don't know how to use	Wasn't aware of this feature	Other
	%	%	%	%	%	%
Viewing the student status page to monitor class' activities during reading time.						
DPS	9.1	9.1	0.0	45.5	18.2	18.2
EPS	8.3	8.3	0.0	33.3	16.7	33.3
Accessing individual student reports to confer with students regarding their progress within the program (e.g., books checked out, completed, Lexile score change, etcetera).						
DPS	15.4	7.7	7.7	23.1	30.8	15.4
EPS	7.1	7.1	7.1	28.6	21.4	28.6
Assigning a common book to all students or a small group of students.						
DPS	11.8	11.8	0.0	11.8	41.2	23.5
EPS	14.7	11.8	0.0	32.4	23.5	17.6
Directing students to use the ThinkFeed for annotations or responding to a prompt.						
DPS	23.1	0.0	0.0	30.8	23.1	23.1
EPS	28.6	4.8	0.0	33.3	9.5	23.8

Appendix F: Student Survey

Rate your degree of agreement to each of the following survey items.

Scale: Strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, strongly disagree

1. LightSail was easy for me to use.
2. LightSail was fun (engaging, interesting) to use.
3. LightSail helped me to learn.
4. LightSail helped me to do better on tests.
5. LightSail was a good fit – not too hard or too easy.
6. LightSail made me more interested in reading.
7. LightSail let me learn in a way that's good for me.
8. I would like to use programs like this one in the future.

Open-Ended Questions

1. Did you like using this program? Why or why not?

2. What did you like best about it?

3. What did you like least?

Appendix G: Student Survey Descriptive Statistics and Response Frequencies

Rate your level of agreement to the following statements.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree			
	%	%	%	%	%	N	*M*	*SD*
1. LightSail was easy for me to use.								
DPS	6.9	15.7	15.4	32.4	29.7	306	3.62	1.25
EPS	9.9	13.7	15.6	29.7	31.1	505	3.58	1.32
2. LightSail was fun (engaging, interesting) to use.								
DPS	18.4	17.1	14.8	18.1	31.6	304	3.27	1.51
EPS	24.5	12.6	18.2	24.1	20.6	506	3.04	1.47
3. LightSail helped me to learn.								
DPS	15.3	15.7	15.3	20.3	33.3	300	3.41	1.47
EPS	20.1	17.5	19.7	21.5	21.3	503	3.06	1.43
4. LightSail helped me to do better on tests.								
DPS	27.8	15.4	21.7	16.1	19.1	299	2.83	1.47
EPS	33.1	14.1	24.0	16.5	12.3	504	2.61	1.40
5. LightSail was a good fit - not too hard or too easy.								
DPS	12.3	11.3	18.2	24.8	33.4	302	3.56	1.37
EPS	16.0	9.8	20.0	24.8	29.5	501	3.42	1.41
6. LightSail made me more interested in reading.								
DPS	26.0	14.3	12.7	16.7	30.3	300	3.11	1.60
EPS	25.9	13.1	21.3	17.7	22.1	498	2.97	1.49
7. LightSail let me learn in a way that's good for me.								
DPS	18.9	12.5	18.9	22.6	27.3	297	3.27	1.46
EPS	21.3	14.7	20.1	22.5	21.5	498	3.08	1.44
8. I would like to use programs like this one in the future.								
DPS	24.9	12.6	15.9	15.9	30.6	301	3.15	1.58
EPS	28.0	10.8	19.0	18.0	24.3	490	3.00	1.54

Appendix H: LightSail Usage Data

Table 1.

Mean results of LightSail usage data by district

	Total Average (*n* = 1,826)		DPS (*n* = 687)		EPS (*n* = 719)		OUSD (*n* = 420)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Days Logged In	33.45	32.41	47.46	33.92	27.15	33.83	21.31	13.88
Minutes Read Ytd	527.26	680.14	768.68	833.48	407.49	602.64	337.39	314.36
Books Completed Ytd	18.12	29.40	21.80	31.39	9.55	22.64	26.76	32.40
Active School Days	90.47	53.76	112.98	49.90	89.50	60.31	54.11	19.19
Active School Weeks	18.10	10.75	22.60	9.98	17.90	12.06	10.82	3.84
Growth Per School Week	3.28	13.21	2.58	8.92	5.19	19.29	2.44	11.08
Minutes Per School Day	6.45	5.23	7.19	5.95	5.49	4.45	6.54	4.73
Minutes Per Login	11.47	8.23	12.85	7.94	9.56	8.54	12.50	7.50
Power Challenge Complete	0.90	0.31	0.97	0.17	0.79	0.41	0.96	0.20
Student Annotations Ytd	2.17	8.24	3.09	11.26	1.56	4.77	1.70	6.87
Teacher Responses Ytd	0.18	1.00	0.05	0.35	0.37	1.52	0.05	0.25
Srq Answered Ytd	4.09	6.67	5.95	8.16	2.83	5.78	3.22	4.30
Srq Grade Ytd	0.72	2.29	0.58	2.18	0.67	2.32	1.04	2.37
Srq Avg Score Ytd	0.34	0.12	0.33	0.11	0.39	0.13	0.32	0.11
Mcq Answered Ytd	18.94	25.73	24.67	28.92	12.58	20.28	20.48	26.16
Mcq Avg Score Ytd	0.54	0.24	0.52	0.21	0.60	0.26	0.49	0.23
Starting Lexile	553.58	257.97	532.55	270.60	630.19	254.63	480.18	209.26
Current Lexile	596.61	305.58	575.95	326.64	686.22	296.67	504.21	242.33
Lexile Cycles Ytd	1.83	2.12	2.33	2.24	1.41	2.20	1.72	1.54
Lexile Growth Ytd	64.70	144.47	58.76	153.55	103.99	141.12	33.31	121.41
Typical MM Growth	2.18	0.15	2.30	0.00	2.00	0.00	2.30	0.00

Table 2.
LightSail usage within OUSD schools

	Active School Days		Active School Weeks		Minutes Per School Day		Minutes Read Ytd	
School Name	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Bella Vista ES	69.00	13.00	13.80	2.70	7.11	2.97	480.69	244.92
Bridges Academy at Melrose	50.00	23.00	9.90	4.70	3.02	2.43	147.52	151.99
East Oakland Pride-Webster	39.00	20.00	7.90	4.10	3.56	2.92	100.21	119.48
Fred T Korematsu Discovery Academy	61.00	11.00	12.10	2.30	8.66	5.28	512.76	340.10
Martin Luther King Jr ES	57.00	14.00	11.30	2.80	9.62	3.72	567.44	243.35
New Highland Academy	60.00	5.00	11.90	1.00	4.86	1.87	291.52	120.00
Redwood Heights ES	14.00	15.00	2.90	3.00	4.07	3.16	8.82	18.18
Think College NOW School	45.00	15.00	9.00	3.10	8.37	6.83	381.99	420.95
Total	54.11	19.19	10.82	3.84	6.54	4.73	337.39	314.36

Table 3.
LightSail usage within EPS schools

	Active School Days		Active School Weeks		Minutes Per School Day		Minutes Read Ytd	
School Name	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Harmony ES	25.00	35.00	5.00	7.00	1.76	0.95	4.80	19.52
Illahee ES	104.00	31.00	20.80	6.10	6.11	3.56	462.02	473.18
Image ES	133.00	34.00	26.70	6.80	6.47	4.55	930.63	774.83
Marrion ES	12.00	17.00	2.40	3.40	2.22	2.47	0.73	2.30
Orchards ES	144.00	33.00	28.70	6.70	7.65	3.47	1107.61	556.09
Pioneer ES	18.00	12.00	3.60	2.50	5.75	6.52	52.29	71.92
Riverview ES	11.00	9.00	2.10	1.80	3.35	2.03	19.19	13.12
Sifton ES	106.00	46.00	21.10	9.20	2.66	2.37	210.08	280.95
Sunset ES	8.00	5.00	1.50	0.90	5.15	6.18	14.50	15.75
York ES	22.00	13.00	4.40	2.50	3.02	2.14	44.25	40.57
Total	89.50	60.31	17.90	12.06	5.49	4.45	407.49	602.64

Table 4.
LightSail usage within DPS schools

	Active School Days		Active School Weeks		Minutes Per School Day		Minutes Read Ytd	
School Name	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Asbury ES	82.00	53.00	16.40	10.70	2.49	3.60	67.12	90.09
Ashley ES	121.00	37.00	24.30	7.30	5.70	3.98	695.25	606.48
Barnum ES	71.00	56.00	14.30	11.30	7.32	3.41	472.91	433.55
Columbian ES	141.00	18.00	28.20	3.60	13.85	10.50	1915.72	1470.42
DCIS at Fairmont	137.00	38.00	27.30	7.50	6.22	6.46	713.56	547.59
High Tech ES	149.00	30.00	29.90	6.00	6.96	4.09	1046.66	709.81
Sabin World School	114.00	29.00	22.80	5.80	8.51	6.61	982.49	872.52
Samuels ES	64.00	33.00	12.70	6.60	5.80	4.30	313.46	304.48
Slavens K-8 School	147.00	25.00	29.50	5.00	6.71	3.40	997.26	539.15
Southmoor ES	33.00	24.00	6.70	4.90	3.18	3.73	36.42	87.69
Trevista at Horace Mann	125.00	41.00	25.10	8.30	11.53	7.07	1461.01	1097.50
Total	112.98	49.90	22.60	9.98	7.19	5.95	768.68	833.48